

THE
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PART I.
ORIGINAL COMMUNICATIONS.

ART. XII.—*Surgical Reports.* By GEORGE H. PORTER, M.D., Univ. Dub.; F.R.C.S.I., Senior Surgeon to the Meath Hospital and County of Dublin Infirmary; Surgeon to Simpson's Hospital; Examiner in Surgery Royal College of Surgeons, Ireland; Consulting Surgeon to the Coombe Lying-in Hospital; Member of Council of the Surgical Society of Ireland, and of the Pathological Society of Dublin; Lecturer on Clinical Surgery.

I.—EXCISION OF A LARGE PORTION OF THE UPPER-JAW FOR EPULOID DISEASE; RECOVERY.

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1.—*Excision of a Large Portion of the Upper-Jaw for Epuloid Disease; Recovery.*

In every operation in any degree implicating the human face it must ever be desirable, as much as possible, to guard against the

production of subsequent deformity. The removal of an unsightly tumour of the jaw-bone, which distorted the soft parts of the face covering the swelling, is a great benefit; but in accomplishing this the prevention of disfigurement, by cicatrices of those structures, is of the utmost importance. Among those eminent men who, by their valuable suggestions, have aided the operator in excising the upper jaw, or portions of it, Sir William Fergusson holds a foremost position. Various incisions to lay bare growths from the superior maxilla have been recommended, all of them most useful in the cases to which they are immediately applicable, and tending to assist the surgeon in dealing with such tumours. I believe, however, that in the majority of instances, a small amount of cutting into the soft parts will suffice to allow the excision of a large portion of the upper-jaw. The following case, I consider, proves, in a very marked way, the advantages of the simple incision practised by the distinguished surgeon before mentioned in removing tumours of a moderate, and even of a large size from the upper-jaw. The trifling incision made vertically through the centre of the upper-lip, and prolonged into one or both nostrils, affords space enough to remove most of ordinary tumours of the superior maxilla, and leaves very little trace, or slight disfigurement behind. Great stress is laid upon the advantages of this incision by Sir William Fergusson, in the following quotation, which I take from one of his lectures (No. IV.), delivered at the Royal College of Surgeons, London, in 1865, on the "Progress of Surgery during the present Century." He says:—"There are two advantages of great importance, in my opinion, associated with this incision. First, the wound being made in the furrow below the columna, and exactly in the middle of the lip, is less observable than on any other part; and next, there is an inch in length gained by the natural opening of the nostril. The ala of the nose is so easily raised, and with the tip can be so easily moved according to the will and wish of the operator, and the cheek can be so readily dissected off the tumour as high as the margin of the orbit, and as far out as the malar bone, that a large space for operation on the anterior surface of the maxilla is easily made. Since 1848 I have never made any other incision in the upper-lip; and I have no hesitation in stating, from experience of twenty cases or more, that in a number of operations of moderate-sized tumours there is no need for more extensive incisions on the outer surface of the face."

Bessy G., aged forty years, married, was sent to me by my friend

Dr. L'Estrange, of Dublin, and admitted into the Meath Hospital, August 10th, 1867. Her health appeared to be good; she was not wasted, nor did she complain of pain. Her left cheek was visibly swollen and distorted, and a well-defined tumour, of a somewhat globular shape, appeared about its centre, but still the deformity was not very great. She stated that the growth was of nearly three years' duration, but latterly had commenced to increase very rapidly. On opening the mouth a tumour about the size of a hen's egg came into view. Its surface was smooth, with the exception of a speck of ulceration, about the size of a three-penny piece, in the centre of its most prominent point. It was almost globular, but slightly longer from before backwards. The two incisor, and the last molar teeth were all that remained on that side of the upper-jaw. The colour of the tumour was a little deeper than that of the healthy gum structure. To the touch it was very firm, but not of a stony hardness, nor was it nodulated. It had never bled. It extended half way in on the roof of the mouth. The patient found some difficulty in masticating, and her voice was a little interfered with. The left nostril was quite free, and there was no glandular enlargement to be found anywhere. As there was no evidence whatever of malignancy, and having had the advice of my colleagues, I determined to excise the growth. To this she at once assented, as she had come into the hospital for that purpose.

Operation, August 22nd.—I excised the tumour in the following manner:—She was placed sitting in a strong chair, which was then gently thrown backward, so as to put her in a semi-reclining position, whilst chloroform was carefully administered. This having been accomplished, Dr. L'Estrange extracted the two left incisor teeth in a most expert manner. My assistants then raised the chair, so as to bring her again to an almost erect sitting posture, the head slightly drawn backwards, and held firmly. I then, with a medium-sized scalpel, quickly cut through the upper lip, exactly in the median line, and immediately afterwards carried the incision into the left nostril. A colleague then seized the opposite flap, whilst I held the one on the diseased side, so that bleeding from the coronary arteries was arrested. This amount of cutting, combined with traction made on the cheek by means of a copper retractor, brought a great portion of the abnormal growth into view. Keeping the knife close to the bone, I cleared the soft structures from the maxilla fairly above, and isolated the tumour superiorly to about a quarter of an inch below the infra-orbital

foramen. A small vessel sprang during this dissection, which was easily secured. I then cut through the mucous membrane of the hard palate from behind forwards, and through the gum tissue in front, so as to make a groove for a strong cutting bone forceps, one blade of which I inserted into the left nostril, and the second into the mouth, and rapidly cut through the palate plate. With the little saw (somewhat resembling Hey's, but known as Sir William Fergusson's), I proceeded to cut through the front and side of the superior maxillary bone, about midway between the infra-orbital foramen and the alveolar process. Grasping the mass with a strong lion forceps, I forcibly depressed the tumour with the adherent bone, breaking down attachments behind, and wrenching the entire from its bed. A few more touches of the knife to soft parts which held it allowed me to remove the whole tumour. I now cleaned out the mouth and wound with sponges; and finding a bleeding point in the bone, I touched it with a small red-hot iron, which arrested all hemorrhage. The cavity was now filled with four little pads of lint, having strings attached. The sides of the wound in the lip I brought accurately together by means of two needles with twisted sutures, and one point of interrupted silver wire suture in the red part of the lip. The three cords attached to the plugs of lint which filled up the cavity, along with the ligature, were brought out at the left commissure of the mouth, and fastened to the cheek by a small piece of adhesive plaster. A narrow strip of this plaster was then placed over the wound to relieve tension on the sutures, and more effectually to support the parts. The patient was then removed to bed, and a draught, containing twenty-five drops of Battley's liquor of opium, was administered. Some beef-tea was ordered during the day, and it was directed that the mouth should be washed out with iced water.

August 23rd.—The patient slept well; the cheek was slightly swollen, but she suffered no pain, unless when she swallowed; pulse, 96; beef-tea ordered, with crumb of bread softened in it.

August 24th.—Had passed a good night; the swelling in her face was less, and her pulse had fallen to 90.

August 25th.—She was better to-day. The needles were removed, also the wire suture, and the wound was found to be firmly united throughout. Suppuration was established in the former site of the tumour, and she complained of a disagreeable odour from the discharge. One of the plugs was then removed, and she was directed to wash her mouth with a lotion consisting of





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Forster & Co., Dublin.

one drachm of solution of chlorinated soda, in half a pint of water.

August 26th.—The remaining plugs were removed, and on looking into the mouth the sore part looked healthy and granulating.

It would be useless to further note the daily report of the case. The ligature came away on 31st of August, and she progressed steadily from day to day, leaving the hospital, cured, on the 7th September, just sixteen days after undergoing the operation. In the drawings taken before and after this operation, Plate I., Fig. 1, faithfully shows her appearance before the operation, and Fig. 2, her condition after it. The trifling mark which remained from the incision through the upper lip is a palpable proof of the advantages of this mode of dealing with such a case, and its whole management shows very clearly that a large amount of disease extensively implicating the superior maxilla, may be removed with ease by this simple incision. Dr. John Barker, the distinguished curator of the Museum of the Royal College of Surgeons, kindly examined the growth, and favoured me with the following description:—

“ 83, Waterloo Road,
“ August 31, 1866.

“ MY DEAR PORTER,—The specimen you gave me appears to be one of epuloid growth. I examined it carefully under a power of about 400 diameters, and it presented the aspect mentioned by Paget as appertaining to fibrous epulis, with a gelatinous base. Many of the fibrous bands are curled and elastic; and although in some portions of the tissue they appear knotted, and in other parts dilated into cells, still the mass has a very uniform character. I do not think the cells have that independent appearance so characteristic of malignant disease. The specimen swelled up very much under the staining process, and became more gelatinous, the colour principally resting in the fibrous bands, giving evidence that these were the latest formed materials.

“ I remain yours,

“ Very truly,

“ JOHN BARKER.

“ Geo. Porter, M.D.” •

2.—*Complete Excision of the Elbow-joint for Strumous Disease; Recovery.*

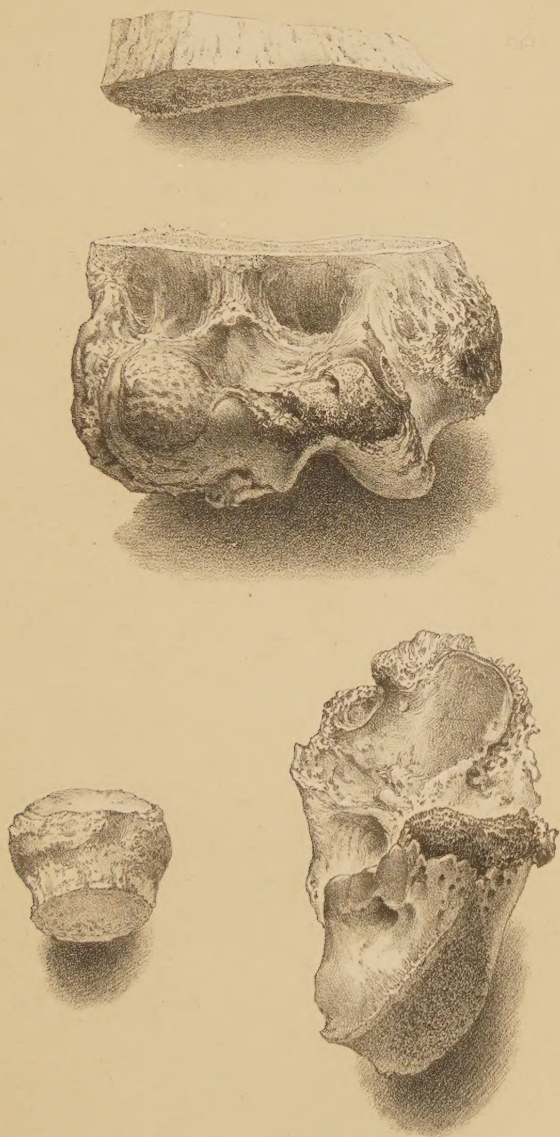
In the *Dublin Quarterly Journal* for November, 1860, I published

a case of resection of the elbow-joint for compound fracture, the result of which was most successful, as the man operated upon, who was a painter by trade, was afterwards enabled to use that limb at his wonted employment. The following case was one in which the operation was performed under much more unfavourable circumstances, the constitution of the patient having been debilitated by scrofulous disease of the tibia, for which the late Mr. Smyly had amputated her left leg below the knee, on the 4th November, 1863:—

Julia D., aged thirteen years, was admitted into the Meath Hospital the 21st August, 1866. She was a very delicate child. Her right elbow joint was much swollen and stiff, and the seat of constant excruciating pain. She suffered also from nocturnal sweats. The posterior aspect of the articulation was occupied by a large unhealthy ulcer, from which a sinus led inwards to diseased bone in the immediate neighbourhood of the joint. Symptoms of disease had been present for two years; and the forearm and hand having been rendered useless, it was determined to cut down and remove the diseased bones.

September 26th.—She was laid on the operating table, and having been thoroughly chloroformed my assistant held the limb in a prone position, and at the same time so grasped it as to command the brachial artery. The precaution, however, was hardly requisite, as severe hemorrhage seldom occurs during this operation, the part of the limb to be opened being away from vessels of magnitude.

With a strong scalpel I made a longitudinal incision four inches in length along the back of the joint in the middle line, part of it passing through the ulcerated structures. I then made a second incision from the external condyle, so as to meet the first. The flaps thus cut were carefully dissected up, and the lateral ligaments, or at least such portions of them as remained, were divided, and the tendon of the triceps severed. My assistant then forcibly flexed the joint, and brought its diseased interior fairly into view. I then, chiefly with the handle of my knife, cleared the soft parts from the extremities of the bones, separating them with more care on the inside to avoid injury to the ulnar nerve. Having accomplished this I placed the reversed blade of Butcher's saw in front and above the condyle of the humerus, and rapidly cut through the bone towards myself. This section appeared redder and softer than I liked; I therefore cut off a second slice of bone, which revealed to



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view healthy osseous structure. I sawed off the olecranon and coronoid processes of the ulna, and the head of the radius in the same manner. With a strong pair of scissors I then pared away any thickened structures about the joint, and having tied three small vessels, I immediately washed out the wound by pouring into it cold water from a height, and introduced four points of silver wire suture to approximate the flaps, dressing the wound with strips of lint wet with spirit lotion. I gently flexed the forearm to a right angle, and placed the limb, carefully bandaged, on a well-padded rectangular wire splint. The patient was forthwith put to bed, and got an opiate.

The daily record of the case does not present any peculiarity. Passive motion was commenced about sixteen days after the operation, and increased gradually so as to ensure the formation of a false joint. The girl now possesses great command over the motions of the forearm and hand; she can supinate and pronate, flex and extend, the forearm, and can use her fingers sewing.

On examination of the portions of bone which had been removed, it was found that the cartilage had disappeared from part of the trochlear surface of the humerus, and had been replaced by fungous granulations, the greater sigmoid cavity having been almost filled up with a gelatinous fleshy mass; the coronoid and olecranon processes were denuded of periosteum and covered with spiculated bony projections; the head of the radius, at its articulation with the humerus, was diseased, the radio-ulnar joint alone remaining sound.

Plate II. gives a faithful representation of the different portions excised. Two inches and a half of bone were removed. The primary incision which I adopted in the present case, as well as that in which the excision was performed for compound fracture, was one which gave ample room for the exposure of the articulating ends of the bones about to be removed. Different operators of eminence, however, recommend various preparatory incisions; as, for example, the H-shaped incision—Moreau, Fergusson, and Syme. The single vertical is recommended by Park, Chassaignac, and Langenbeck; the crucial by Park, Fergusson; the semi-lunar by Gross. All these methods have their respective advocates. Syme, to whom much is due for bringing this operation to perfection, in his *Observations in Clinical Surgery*, speaks highly of the H-shaped. He says:—"This incision I still regard as the most convenient for the purpose, since it not only affords free access to the joint, but also allows the transverse part of the wound to heal

by the first intention, and thus prevent the obstacle to mobility which would result from the process of granulation, followed by cicatrization at this part." The form of cut adopted in this case will, I feel confident, be found amply sufficient and convenient. The advantages of this operation as a conservative measure require in the present day no advocacy, excision of the elbow-joint having been firmly established among the safe and beneficial operations. Whether performed for joint disease, compound fracture, or inconvenient ankylosis, it has been found that the proportion of deaths is very small, amounting to about 22·15 per cent., while amputation through the humerus yields 33·4 per cent. of deaths. Another encouraging circumstance is that this operation is most successful in young patients, among which class it is likely to be more frequently performed from the prevalence of joint disease in early life. The drawing, Plate III., gives a very good representation of the present condition of the limb, which is in every respect a most useful one.

3.—*Excision of a Large-sized Epulis, Springing from the Lower-Jaw; Recovery.*

Cecilia O., aged twenty-nine years, and married, was admitted into the Meath Hospital, under my care, July 16th, 1866, suffering from a large epulis. This woman was in a very weakly condition, having been confined only three weeks previously; and prior to that event, her circumstances being very straitened, she was ill clad and badly nourished. On admission she presented the following symptoms:—Her left lower jaw appeared at first sight greatly swollen, as if from a severe gum-boil. The examination of her mouth, however, displayed a large tumour, occupying the position of the teeth on that side of the inferior maxilla from the second incisor to the last but one molar. Its measurements, taken with a callipers, were one inch and a-half in its transverse diameter, and one inch six-eighths in its antero-posterior diameter. It pushed the tongue towards the right side. Its colour was that of the surrounding gum structure, and its surface was slightly lobulated, giving it a somewhat hour-glass shape. To the touch it felt firm and elastic, like healthy gum tissue. Its upper surface was ulcerated from pressure of the teeth of the upper jaw indenting the growth. The patient was unable to close the teeth in front, a space of half an inch existing between the upper and lower incisors. She suffered pain when she tried to masticate. The only teeth visible on that side were the

incisors and the last molar. The others had (with the exception of the first molar) been thrust out by the tumour, which had apparently sprang from the socket of this tooth after its extraction two years previously. She did not feel any pain until the ulceration of its surface commenced, nor had the tumour bled before it ulcerated. Although wretchedly emaciated and looking feeble, there was no malignancy in her aspect, so that the absence of glandular contamination, coupled with the length of time it had taken to grow, made me decide on its removal. Any operative interference, however, in her debilitated condition was not to be thought of, so I determined to bring up her health by generous diet and rest.

On the 10th of August, her strength having very much improved, I proceeded to excise the tumour in the manner following:—I had her placed on a low table, with her head and shoulders slightly raised, and had chloroform administered. And here I may remark that although some surgeons have a great objection to the use of this agent when operating on the mouth, still my colleagues and I frequently give it in such cases, and never fear an unpleasant result, provided that any flow of blood is rapidly sponged up as the necessary incisions are proceeded with. The second incisor was drawn, and one of my colleagues having inserted a strong copper spatula, bent to an abrupt curve at its end, into the mouth, he forcibly dragged the cheek outwards and backwards. This manœuvre gave me a good deal of room, but not sufficient to allow me to work with a saw behind the tumour without splitting the cheek. The tongue having been well depressed, I cut downwards through the mucous membrane inside and outside the jaw, behind the mass, to about the extent of half an inch from the alveolar process. I then, with a strong nippers, the blades of which I placed in the incisions, cut through the bone to the same depth from the surface of the alveolar process. I now carried similar incisions through the mucous membrane in front of the epulis, and cut, with a small saw, to the same depth in the jaw bone as I had done behind with the nippers. Having now isolated the swelling before and posteriorly, I made incisions connecting these on the outside and inside through the lining membrane. Then with the saw I partially cut through the body of the inferior maxilla beneath the epulis, and completed its entire removal by means of a strong cross-cutting nippers. There was very free hemorrhage from the inferior dental artery, but I carefully plugged the space with lint, over which I placed a thick compress, and tightly bandaged the lower-jaw to the upper. This arrested all

bleeding. At the same time sufficient space was permitted between the front teeth to allow of the patient getting fluids with a spoon. She was then removed to bed, and an opiate administered. On examination the tumour appeared to be a simple epulis. The section of the bone was sound, and the growth had arisen from the sockets of the teeth, and overlapped externally and internally. The above case may be considered interesting, showing, as it does, the feasibility of extirpating a large tumour from the lower maxilla without the infliction of any wound on the face. The epulis itself afforded a larger example of this disease than is usually met with. This poor woman made a good recovery, and left the hospital on the 31st August in excellent health.

ART. XIII.—*Contributions to Operative Surgery.* By HENRY GRAY CROLY, F.R.C.S.I.; Licentiate of the King and Queen's College of Physicians; Surgeon to the City of Dublin Hospital; Lecturer on Clinical Surgery; Senior Demonstrator of Surgical and Descriptive Anatomy in the School of Surgery of the Royal College of Surgeons.

FOUR cases of Amputation by long and short rectangular flaps (Teale's method), illustrated by practical observations advocating this mode of operation, viz:—

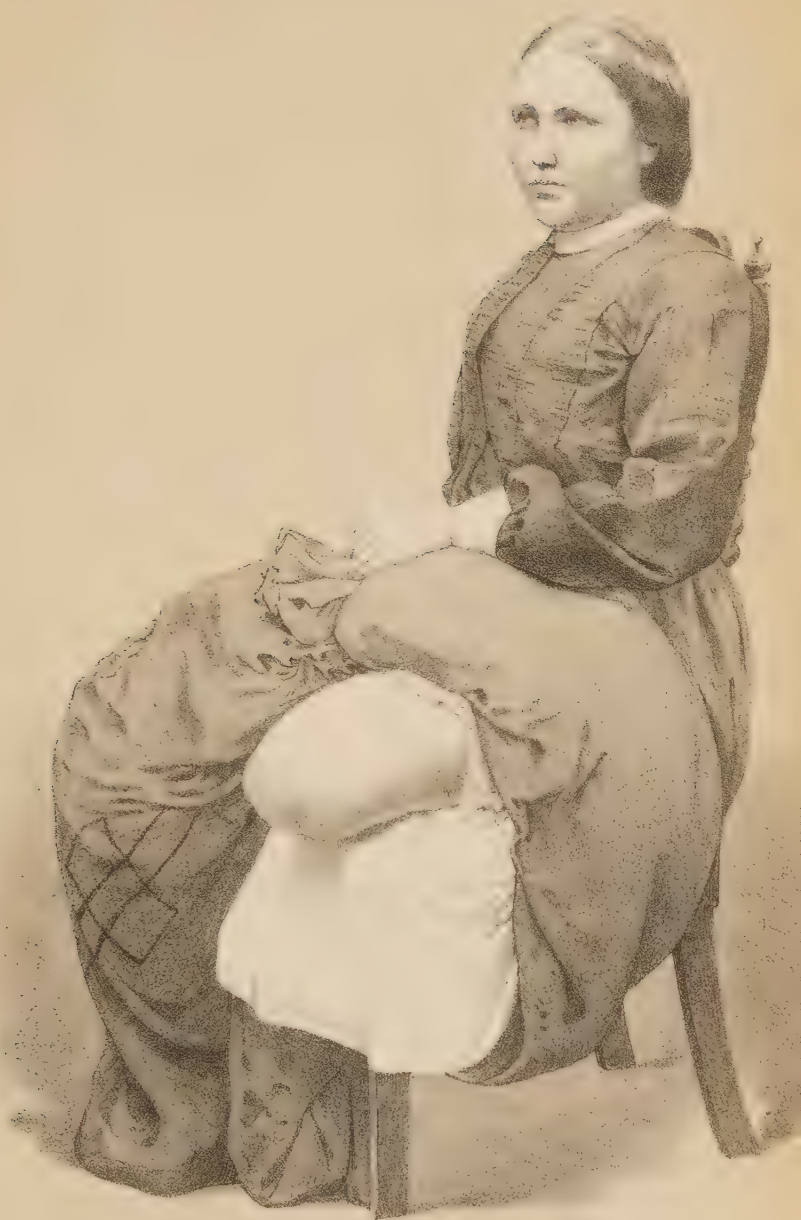
I.—AMPUTATION OF THE LOWER THIRD OF THE LEFT THIGH; RECOVERY.

II.—AMPUTATION OF THE ARM; RECOVERY.

III.—AMPUTATION OF THE ARM; RECOVERY.

IV.—AMPUTATION OF THE LOWER THIRD OF THE LEFT THIGH; RECOVERY.

When the surgeon is called upon to amputate a limb the first question which naturally suggests itself to his mind is, by which of the several methods shall I perform the operation? And although the subject is one which, from the earliest history of our noble art, has received a large share of attention from surgical writers, there is, perhaps, none on which surgeons, even in the present day, are more undecided. We find some preferring the old circular method—



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this particular operation, and the just preference which it is fast attaining by surgeons in almost every quarter of the globe. And I may here observe that although I was not the first surgeon to perform Teale's amputation in this country, I may venture to take credit to myself for having been the first to introduce the subject to the notice of the profession, as will appear in a subsequent part of this paper.

CASE I.—D. H., a female aged fifty-five years, was admitted into the City of Dublin Hospital on the 10th of October, 1863, suffering from a large ulcer on the left leg. She presented a wretchedly emaciated appearance, had a feeble and rapid pulse; perspired freely at night; had no appetite, and slept very little, even with the assistance of large opiates, which for some months had been prescribed by a physician who attended her. The poor woman stated that the ulcer commenced by a small blister on the calf of her leg, about two years previously; it gradually spread, but was not painful until twelve months ago; it never healed, and now occupies the entire calf of her leg and also part of the front of the limb. The discharge is copious and very fetid. The tibia, I ascertained by manipulation, had been completely eaten through by the ulcer. The patient compared the pain to hot needles darting through her leg. There were no enlarged glands in the groin. She urged me to amputate the limb, but her emaciated appearance and feeble circulation prohibited operative interference at that time. I prescribed a liberal nutritious diet, quinine, opiates, and disinfectant lotions to the ulcer. The poor woman's health improved considerably by this treatment; and on consulting with my surgical colleagues it was decided that she should get the chance of the operation, to which she readily consented. I accordingly proceeded to operate as follows:—

The patient having been placed fully under the influence of chloroform, and the femoral artery controlled by digital pressure, I measured the circumference of the limb at the junction of the middle with the lower third of the thigh, and having doubled the string I marked out with ink, in the presence of my colleagues and a large class of pupils, the anterior rectangular flap, which was the length and breadth of half the circumference of the limb, and the short flap, which equalled one-fourth of the length of the anterior flap.

The lateral incisions were made with a stout scalpel through the

Fig 2



N 1





integuments only, and the transverse incision went down to the bone. The long flap, thus mapped out, was rapidly dissected and drawn up by an assistant. I next, with an ordinary circular amputation-knife, made the short flap by cutting, at one sweep, down to the bone, and then dissected the short flap up to the base of the long. A retractor was applied, and the bone sawed. The femoral and profunda arteries and some muscular branches were ligatured. The angles of the long flap were then brought into close approximation with the angles of the short flap and fixed by wire sutures. The lateral incisions were closed in a similar manner. Scarcely any blood was lost. The patient quickly recovered from the chloroform, and was placed comfortably in bed, with the stump resting on a small pillow, covered with oiled silk. No adhesive plaster or bandage was applied. The stump healed by the "first intention." The ligatures separated within a fortnight. I exhibited this patient at a meeting of the Surgical Society, and thus, for the first time, was Teale's amputation brought under the Society's notice.

CASE II.—J. H., aged fifteen years, a native of Mountmelick (Queen's County), was admitted into the City of Dublin Hospital on the 6th of May, 1864. He was sent to me by my friend Dr. Clarke, medical officer to the Mountmelick Workhouse fever hospital, &c., who kindly furnished me with the following particulars of the case. He is the son of strumous parents; from childhood he has been affected with struma in the glands of the neck. About five years ago his right elbow became affected; pains were taken to restore it without success. On admission to hospital the elbow presented the appearance (too well known to require description) of extensive scrofulous disease. On consultation with my colleagues it was determined that amputation should be performed. Having placed the patient fully under the influence of chloroform I laid open the joint by the H incision, hoping, if possible, to save his arm, but finding the humerus too much diseased I converted the upper part of the H incision into the long flap of "Teale," and formed the short flap by one sweep of the catlin. The wounds healed by "first intention," and the boy returned home on the 2nd of August (three months after admission), and has since been in the enjoyment of good health, and has a most excellent stump.

CASE III.—R. M., aged thirty-three years, was admitted into

the City of Dublin Hospital, under my care, on the 5th of November, 1865, suffering from scrofulous disease of his right elbow-joint. The disease commenced nine months previously. A number of sinuses existed, through which diseased bone could be felt by passing in a probe. It was decided, on consultation, that the arm should be amputated. I performed the operation by Teale's method, and the wound healed with rapidity.

CASE IV.—A. M'A., aged nineteen years, a fine country girl, residing in the county of Monaghan, was admitted into the City of Dublin Hospital, under my care, on the 16th December, 1865, suffering from enlargement of the left knee-joint. The girl, who has always enjoyed excellent health, and whose parents, brothers, and sisters, are also healthy, stated that she slipped and fell on her knee eighteen months previously. The joint became swollen, and she was obliged to remain in bed for a fortnight. She was visited by a medical gentleman who blistered her joint. She was not much relieved by that treatment. In the Spring of the past year the knee became painful (especially at the internal side); it was then painted with tincture of iodine. Eight months subsequently the joint was observed to enlarge, and has since gradually increased in size; the limb started occasionally at night. The patient has not been able to walk on the leg for fifteen months.

State on admission to hospital. Left knee-joint much enlarged; the tibia is displaced backwards, the foot and leg appear natural, large veins are observed ramifying over the internal side of the joint, the periosteum of the femur is thickened as high as the junction of the middle with the lower third of the bone, and gradually expands to the joint. On grasping the leg it can be moved laterally with facility; pain is complained of when the tibia is pressed upwards against the femur. The patella is slightly movable, and situated on the lower part of the joint; the swelling on the outside has a hard almost bony feel; and on the inside there is a distinct fluctuation.

The following are the measurements of the diseased and sound joints:—

DISEASED JOINT.

Circumference of thigh at junction of middle with			
	lower third,	-	16 inches.
„	„ immediately above the joint,	-	18 $\frac{1}{4}$ „
„	across the centre of the patella,	-	19 $\frac{3}{4}$ „
„	below knee-joint,	-	16 „

SOUND JOINT.

Circumference of thigh at junction of middle with

	lower third,	-	-	14½ inches.
„	„	immediately above the joint,	13	„
„	across the centre of the patella,	-	13	„
„	below knee-joint,	-	12	„

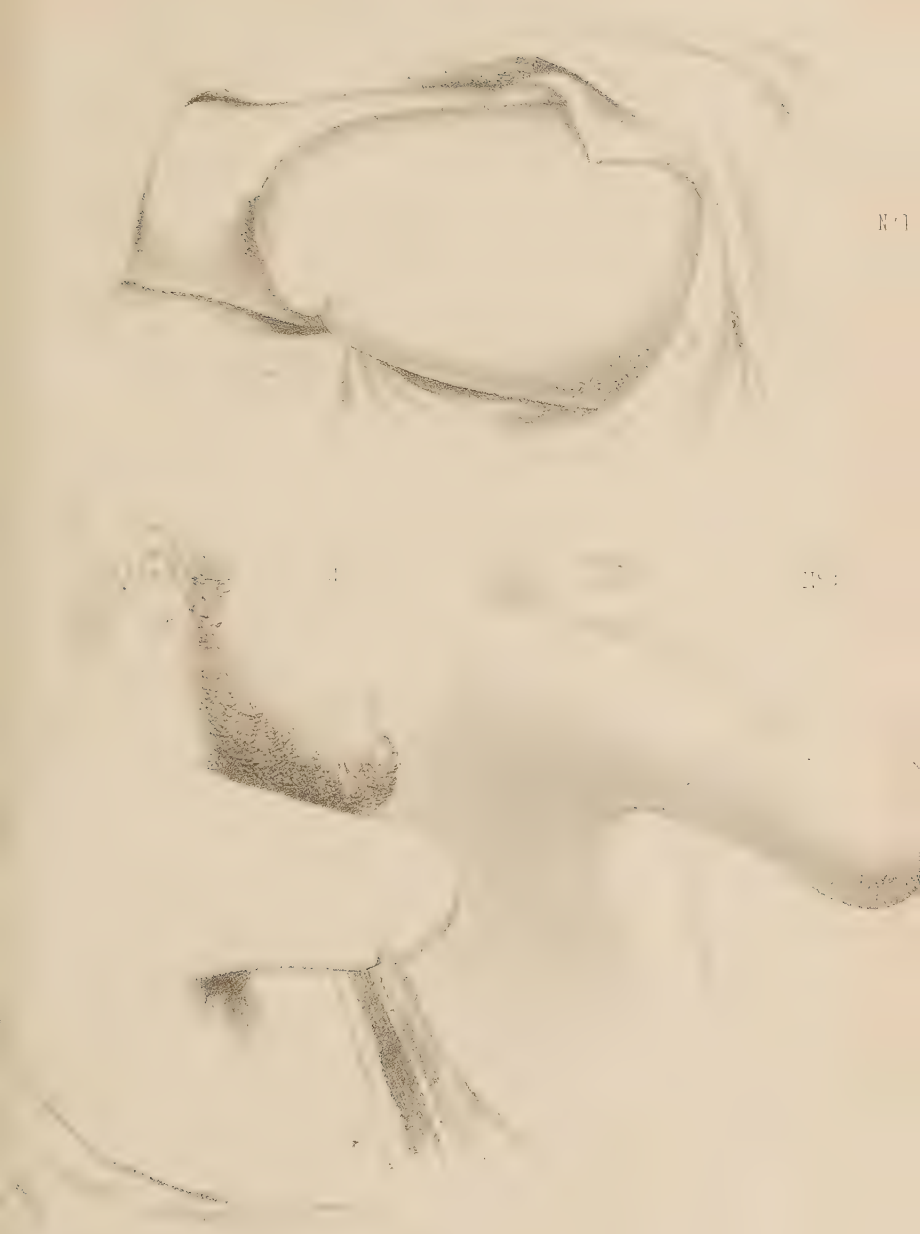
The limb was placed on a well-padded M'Intyre's splint, a horse-shoe shaped blister was applied to the joint, and subsequently Scott's dressing, covered with even strapping of adhesive plaster to afford firm support. Iodide of potassium in bark, good diet, and porter, were prescribed. When the weather admitted the patient was carried out into the open air.

January 19th.—The dressings were removed, and on re-measuring the joint, it was found to have *increased* in circumference by a quarter of an inch across the patella. I passed an exploring needle into the swelling at the inside; blood and serum escaped.

April 30th.—The patient's health continues good, but she perspires at night. On measurement the joint is found to have increased *two inches and a half* in circumference across the patella. Quinine mixture was substituted for the previous medicine. On consulting with my colleagues, it was determined that amputation of the thigh should be performed. The patient readily consented; in fact, from the first time that I saw the joint, I told her, and her brother, who accompanied her, that it would ultimately require amputation, but that every possible means of saving the limb should be first tried.

On Tuesday, May 1st, 1866, assisted by my colleagues, Professors Hargrave and Geoghegan, and Mr. Tufnell, I proceeded to amputate the thigh in its lower third, by Teale's method. The patient had no breakfast, but got an egg beaten up with brandy early in the morning, and, being nervous, was chloroformed in her bed, and carried with the "poles and sheet" to the operation room. In order to preserve as much of the femur as possible, I took the circumference at the exact point from which the periosteum was found to be enlarged (namely, at the junction of the middle with the lower third of the thigh), and having doubled the tape, mapped out the anterior flap which extended beneath the patella. The internal line was first drawn with ink, so as to avoid the femoral artery, where it pierces the adductor magnus muscle, and leave it in the short flap. The external line was next drawn, and both were united beneath the lower margin of the patella. Thus the long flap was

mapped out from the thigh and leg. The lines for the short flap (one-fourth of the long) were also marked. I may here observe that it is the surgeon's duty, as a clinical teacher, to demonstrate clearly in the presence of the pupils the several steps of every surgical operation; and though, from constant practice, I could at any time perform this special operation without resorting to measurements, yet for the reasons already mentioned, I deem the measurements of consequence. The limb having been drawn over the end of the table, and held steadily by an assistant, and pressure applied on the main artery, I made the lateral incisions, with a catlin, through the integuments only, and joined them below by an incision down to the bone; the flap was next dissected quickly up, first consisting of skin only; the knife was sunk deeply, when the upper edge of the patella was cleared, and thus the long flap was rapidly formed. Serous fluid gushed out when the knife entered the sub-crural bursa, which had a free communication with the knee-joint. With one sweep of a large amputating knife, down to the bone, the short flap was made and dissected upon a level with the long flap, the retractor applied, and the femur was rapidly and evenly sawn through with Mr. Butcher's saw. I passed a long needle beneath the femoral artery and vein, and secured them by Sir J. Y. Simpson's third method of acupressure. Three branches were also compressed in a similar manner. The cut surface of the flaps were sponged with cold water, and the long flap was allowed to fall down to meet the short; no sutures were introduced. The flap looked very long, but previous experience prevented me interfering with the length of the flap which cannot be too long when made by measurement. The patient recovered quickly from the effects of the chloroform, and was not conscious of the operation having been performed, so thoroughly was she under the influence of this powerful anesthetic. Having taken a small quantity of wine and water, she was, in a short time, carried back to the ward and put into her bed, which was most comfortably prepared; the stump was placed on a pillow covered with oiled silk. A small artery was observed, in a few minutes, to bleed; I secured it also by acupressure. I remained at the patient's bedside for several hours, feeling anxious about the "acupressure," not having had any previous experience of it on so large a vessel as the femoral artery (indeed, so far as I am aware, it was the first case in which this novel and excellent method of arresting hemorrhage was tried on the femoral artery in Dublin.) The patient became very pale, and vomited several times, a common occurrence after the adminis-



MR. CROLY ON OPERATIVE SURGERY.

Forster & Co, Dublin



tration of chloroform; and though no blood was lost beyond what is usual in amputations of the thigh, the girl showed early symptoms of dangerous collapse; her pulse became almost imperceptible, she was deadly pale, and her breathing was almost inaudible. I lost no time in lowering her head, allowing a current of fresh air to pass over her through the window, besides fanning her. Carbonate of ammonia was cautiously held to nostrils, and small quantities of brandy and ether were administered. The collapse now became so alarming that I introduced a full sized male catheter into the rectum, and injected brandy and ether. Sinapisms were applied over the epigastrium, heart, and calf of leg. The stomach rejected everything, the pulse occasionally improved and became again extremely feeble. At 1 o'clock she got an anodyne enema, and slept for a couple of hours.

3.30 o'clock.—Patient awake, and being restless, I administered another enema. The catheter was allowed to remain passed well up into the bowel, and nutritive injections were administered regularly without any disturbance whatsoever to the patient. I considered it necessary to remain at her bedside until 8 o'clock, p.m. (more than nine hours from the time of operation). I received valuable aid from my friend and former pupil, Dr. D. B. Hewitt, in combating the collapse which followed the operation.

May 2nd.—Mr. Geoghegan and Mr. Popham, senior and junior resident pupils, kept watch in turn during the night, and reported this morning, at my visit, that the patient passed a restless night, that she slept badly, and vomited frequently. She took ice to relieve the sickness of stomach, and prussic acid with creosote was given in small draughts, and iced soda water as drink.

10 o'clock, p.m.—Stomach settled, patient has taken chicken-broth in small quantities. Nutritive enemata continued every second hour, and a couple of grains of quinine added three times in the day. Temperature of the body natural, pulse rapid and feeble, no sleep throughout the day, anodyne enema containing m. xxx. of Battley administered.

May 3rd., 8 o'clock, a.m.—Patient slept well, had no vomiting during the night, face slightly flushed. Pulse 130 in the minute. I withdrew one of the acupressure needles; not a drop of blood followed. The discharge was removed from under the stump without raising it.

10 o'clock, p.m.—Pulse 130, soft and compressible. Countenance

natural, tongue clean. Anodyne enema administered, continue ice, milk, and chicken-broth. Patient refuses to take wine or brandy. Nutritive injections continued.

May 4th.—Patient slept all night. Pulse 120. Skin cool. Face slightly flushed. Stump looking well. Discharge healthy and free.

May 5th.—Pulse 112, soft and regular. Skin cool. Bowels moved. Patient slept well. Fresh napkin placed under the stump.

May 6th.—Pulse 112. Patient slept well; she ate a bit of chicken and drank some good claret.

May 7th.—Pulse 100.

May 8th.—In the presence of a large number of the pupils I withdrew the three remaining acupressure needles. No hemorrhage. Discharge from stump healthy and free. Patient looks well.

The girl continued to improve until the 15th inst., when she was seized with a rigor, and vomited several times. I ordered a turpentine enema to be administered with O'Beirne's tube, and the stomach to be allowed to rest.

May 16th.—Pulse 120. Skin hot. Face slightly flushed. Tongue clean. Bowels freely acted on by enema. No tenderness in the groin or along the course of the vessels. Discharge from stump healthy but not very copious. Edges of wounds natural. No bagging of matter can be found on most careful examination. The edges of the flaps were kept gently together with strips of adhesive plaster, and a compress of lint was applied over the internal side, as there was a slight bagging of pus.

I made pressure over the end of the bone, but no pain was complained of. The covering of muscle is large, soft, and movable. The patient was soon discharged, the stump being perfectly healed.

The following were the appearances observed on the dissection of the knee joint:—

Femur perfectly sound, and of natural size at the site of amputation. Immediately below section the bone was found suddenly large. The condyles of the femur were converted into an osseous cavity, divided by bony plates. The patella situated low down. The internal side of the joint contained a large quantity of yellow-coloured matter in flakes. The muscles and ligaments around the joint were healthy. There was a large gland (containing bony plates) situated in the popliteal space. The periosteum was absent on the posterior surface of the femur.

I had drawings taken of the first and second stumps, and photographs and casts of the others. I enclosed copies of the photographs to Mr. Teale, and received the following courteous and complimentary letters in reply:—

“ St. James’ Lodge,
Woodhouse Lane, Leeds,
April 19th, 1866.

“ MY DEAR SIR,—I thank you very much for your kind letter and photograph. The stump is excellent. I shall be very glad to see your cases reported. It is very gratifying to me to receive similar reports from our own country, as well as from distant parts of the world. When you can again spare time to visit Leeds it will give us much pleasure to see you. Our new hospital, now approaching completion, will, I think, interest you much.

“ Believe me, my dear Sir,
Yours most truly,

“ THOMAS P. TEALE.

“ Henry Gray Croly, Esq.”

Mr. Teale’s second letter:—

“ St. James’ Lodge,
Woodhouse Lane, Leeds,
July 16th, 1866.

“ MY DEAR SIR,—Many thanks for your kindness in sending me the photograph of your excellent stump. I have given directions for its being placed in the photographic album of our new school of medicine. It is very gratifying to me to find the rectangular flap amputation most successfully practised by yourself and other surgeons in Dublin. The stumps do not deteriorate, but, on the contrary, improve by age. It will at all times give my son and myself much pleasure to see you in Leeds when you can spare time to come this way. Our new hospital is proceeding admirably; it is expected to be ready to receive patients in a year from this time. I am sure you will be pleased with it.

“ Believe me, my dear Sir,
Yours very sincerely,

“ THOMAS P. TEALE.

“ Henry Gray Croly, Esq.”

I received the following letter from my friend Dr. Clarke relative to Case II.—*vide* plate:—

“Derrycappa, Mountmelick,
November 28th, 1866.

“MY DEAR CROLY,—As you wish, I send you the particulars relative to James Hamilton, operated on by you in the City of Dublin Hospital for strumous affection of the right elbow joint. About five years ago the joint became affected. Every attempt was made to restore it, but without success, when I sent him to you, two years and a-half since. He is now in the enjoyment of good health; has a most excellent stump, with a pad of muscle over it, which, if he had an instrument to aid him in earning his subsistence, would be of the utmost service to him; for it appears to me that no amount of pressure would affect him, as he has just now applied the weight of his body on it on the table before me without suffering in the least.

“Believe me,
Very sincerely yours,
“JOSEPH CLARKE.”

Letter from Dr. Gilmore, Castleblaney, Co. Monaghan.

“Castleblaney, 21st March, 1867.

“MY DEAR SIR,—You would have had an earlier reply to your letter only I had not an opportunity of seeing Anne M^{rs} Ardle sooner than yesterday. You will be glad to hear she is quite well, and able to make herself generally useful in household affairs. She is loud in her expressions of gratitude to you for the great kindness which she received from your hands when under your care in the City of Dublin Hospital, and more especially for the great skill which you displayed in the management of her case, and the permanent relief which you have afforded her from a most painful and serious disease. From the present condition of the stump you have every reason to be gratified with the result of the operation. I consider the stump to be an exceedingly well formed one. It is perfectly painless, and admirably well adapted for an artificial limb.

“I remain, my dear Sir,
Yours most sincerely,
“SAMUEL GILMORE.

“Henry Gray Croly, Esq,”

I have thus faithfully detailed the history of four interesting cases of amputation by long and short rectangular flaps, and it is gratifying to me that the stumps have met with general approba-

tion. Nothing unusual occurred during or after operation in the three first cases; the stumps were not disturbed for several days after amputation, and no dressing was applied to them. The ordinary ligatures were used, and they separated in the usual time. In the last case, however, I secured the femoral artery and its branches by the third method of acupressure of Sir J. Y. Simpson (*viz.*, by introducing a needle, armed with a twisted wire, under each vessel, and passing a loop of wire over the point-end of the needle and the vessel, and giving it one half twist around the eye-end of needle). On referring to the report of this most instructive and very interesting case it will be observed that I did not bring the flaps together at first. I believe in the majority of cases of amputation that this is the best rule to follow, as it prevents the necessity of reopening the stump in the event of hemorrhage, which is so liable to come on when reaction sets in; but in this special case I naturally felt extremely anxious respecting my patient, having, for the first time in my own practice, applied acupressure instead of the good and safe old ligature. In this case, also, I had to combat collapse following an operation for disease which caused enormous swelling of the joint and enlargement of the blood-vessels; and the patient, although healthy, and having a sound heart, had naturally a very feeble pulse; and (as I subsequently ascertained) was much upset by the receipt of a letter from her parents on the morning of operation urgently requesting her to go home, which she would not consent to. The acupressure acted admirably in this case. I could not account for the awful collapse, which was nearly fatal. The treatment which I adopted—namely, lowering the head, fanning the face, cautiously administering diffusible stimuli by the mouth, the injection of brandy and ether high up into the bowel, the application of sinapisms over the region of the heart and solar plexus had, after some hours, the desired effect. I dreaded the giving way or slipping of the acupressure needles or wires, and took the precaution of placing a tourniquet loosely over the trunk of the femoral artery, so that at a moment's notice the vessels could have been compressed. The vomiting which subsequently occurred in this case, and the consequent necessity for supporting the system entirely by nutritive injections for some days, is also of much practical interest. The rigor which occurred on the 15th day I could not in any way account for. It passed off, and the patient ultimately made an excellent recovery.

My able colleague, Professor Geoghegan, performed amputation of the lower third of the right thigh in January, 1864, by the rectangular flap method for suppurative destruction of the knee joint consequent on a small tuberculous abscess in the head of the tibia, which was generally hypertrophied. The patient was a man, about thirty-five years of age, and is now in the enjoyment of sound health. The following is Dr. Geoghegan's description of the operation:—"The base of the long anterior flap (coinciding with the point of section of the bone) was situated about a hand's breadth above the upper margin of the patella. By careful measurement of the limb operated on, and of the opposite one respectively, it was found that at the side of the operation the limb was curtailed by one-fifth of its length only. The length and breadth of the anterior flap was about eight inches, and the lower edge of the latter passed about an inch beneath the lower margin of the patella. The objections, therefore, to the employment of Teale's method as regards lower thigh amputations, on the score of undue curtailment of bone, are founded on misapprehension." I visited him on the 17th of March last, and found him, with an artificial limb, walking about and able to work all day as a porter on the quay. The stump is excellent and well covered. The cicatrix is considerably above and behind the end of the bone.

My particular friend, Mr. George H. Porter, the eminent senior surgeon of the Meath Hospital, deserves the credit of having been the first in Dublin to perform amputation by the long and short rectangular flap, and informs me that he was induced to adopt this mode of operating by the favourable representations which I had given him of the operation—he performed the operation twice on the thigh successfully.

The rectangular flap operation has been objected to on the grounds that there is an unnecessary sacrifice of bone, and that there is a larger extent of surface exposed to suppurate than in amputation by other methods. To meet the first objection I refer the reader to my fourth case in which I amputated by this mode at the lower third of the thigh, and divided the bone exactly at the point of junction between the sound and diseased parts. I was enabled to do so by taking the long flap partly from the leg, by going below the patella, and thus forming as long if not a longer stump than I could have done in this case by any other method of operating.

* The stump of A. McA. (Plate I., Case IV.) is only three inches and a half shorter

In certain cases of accident, in which the muscles are much torn, it might so happen that the long flap could not be made without a little extra sacrifice of bone, but this is only an exceptional case.

In reply to the second objection, I would observe that in my opinion, the extent of surface exposed to suppuration is more apparent than real, as can be proved by comparing the combined surfaces of the flaps made by transfixion or the circular mode.

In each of my cases the lateral incisions united rapidly, and partly by "the first intention," and the amount of suppuration was less than I have seen from the ordinary flap operations.

Being desirous of satisfying myself on these important practical points, I submitted queries to Mr. Teale a few days ago, and received the following kind reply, which I now publish:—

"March 20th, 1867.

St. James' Lodge,
Woodhouse Lane, Leeds.

"MY DEAR SIR,—I will with pleasure reply to your inquiries on amputation, and at the same time mention the slight modifications in the operation which I have adopted since the publication of my book many years ago.

"1. The sacrifice of bone need not be any greater in rectangular than in circular or transfixion operations.

"To give additional length of bone, I now make the lower transverse line of the long flap as low as the apex of the patella. The skin and cellular tissue are then dissected, as far but no further than the upper border of the patella, when the knife is carried deeply through the extensor muscles, and the flap completed by cutting upwards. In amputation of the thigh for accident in powerful fleshy subjects in order to save bone, I not only make the lower transverse line of the flap as low as the apex of the patella, but I somewhat shorten the flap, knowing that the circumference of the thigh in the largely developed state of its muscles would give greater length than is absolutely necessary after the muscles have become shrunken. In

than the thigh of the sound limb. This is remarkable when contrasted with the length of stump after amputation by other methods.

I lately examined the stump of a woman whose thigh was amputated forty-nine years ago by an eminent surgeon in this city for disease of the knee-joint. The stump measures only *seven inches*, and the cicatrix adheres to the end of the bone.

In another case which I saw a short time since, amputated seventeen years ago, the stump (a thigh) measured only *five inches*—the end of the bone was badly covered, and the cicatrix was adherent.

such subjects also, in cutting the flap upwards, I avoid taking all the fleshy mass in front of the bone, but cut it upwards so as to have about half the thickness of the extensor muscles—a sufficient quantity of flesh and skin for surrounding the end of the bone is thus obtained.

“2. I believe the extent of suppurating surface is nearly the same in rectangular as in the two other modes of amputating, provided the operations are all equally well performed so as to secure a good stump.

“3. I make the lateral incision of the long flap through the integuments only, in order to allow for a little transverse contraction of skin, and thereby to secure the perfect covering of the muscles by skin; otherwise a little bulging out of muscles at the sides might require the skin to be too tightly drawn over the sides of the stump. These remarks apply mainly to amputation of the thigh. My son is very well, and joins me in kindest remembrance, &c.

“Believe me, my dear Sir,

Yours most truly,

“THOMAS P. TEALE.

“H. G. Croly, Esq.”

From the foregoing details of the rectangular flap amputation the following practical conclusions may be deduced:—

1. This mode of operating combines the advantages of both the circular and the flap amputation, without the disadvantages of either. The vessels are divided at right angles, and ample covering of muscle is provided for the bone, while the adherent cicatrix is avoided.

2. The mortality is less after amputation by this mode than by other methods according to statistics already published, and the result of the operation performed by myself and others in this country confirms this important fact.

3. Tension is avoided by ample flaps.

4. The plastic process is not interfered with, and the liability to purulent absorption is diminished.

5. The lateral incisions in most cases unite quickly, and the transverse incision allows the discharges to escape freely.

6. There is no need of bandaging or other dressing, but simply to place the stump on a pillow covered with oiled silk.

7. In marking out the lines for this amputation in the thigh, the surgeon must be careful to avoid including the femoral artery in

the long flap, or splitting the vessel where it pierces the adductor magnus muscle.

8. In amputations of the leg there is a danger of wounding the anterior tibial artery at the base of the flap; to avoid this the handle of the scalpel should be used in raising up the vessels from the inter-osseous membrane; and in the operation high up in the leg the surgeon must be careful not to cut the origin of the anterior tibial artery when dissecting the short flap.

ART. XIV.—*Reports of Hospital Cases.—On Injuries of the Wrist and Ankle Joints.* By WILLIAM MAC CORMAC, M.A., M.D., Q.U.I., F.R.C.S.I.; Surgeon to the Belfast General Hospital; and Vice-President of the Ulster Medical Society.

- I.—EXTENSIVE INJURY OF THE HAND, NECESSITATING THE REMOVAL OF THE WHOLE OF THE CARPUS, AND OF MOST OF THE METACARPUS—RECOVERY WITH A USEFUL LIMB.
- II.—LACERATED WOUND OF THE BACK OF THE WRIST, INVOLVING THE JOINTS OF THE CARPUS—RECOVERY WITH A USEFUL HAND.
- III.—LACERATION OF THE BACK OF THE WRIST, INVOLVING THE CARPAL JOINTS, AND ALSO OF THE PALM—RECOVERY WITH A USEFUL HAND.
- IV.—COMPOUND DISLOCATION INWARDS OF THE ANKLE JOINT, WITH FRACTURE OF THE INNER MALLEOLUS, AND COMMINUTED FRACTURE OF THE FIBULA—DEATH FROM PYEMIA.
- V.—COMPOUND DISLOCATION OF THE ANKLE JOINT, WITH COMPLETE DISLOCATION OF THE ASTRAGALUS OUTWARDS—EXCISION OF THE BONE—RECOVERY WITH A USEFUL FOOT.

IN the following paper I purpose giving an account of some cases of injury of the wrist and ankle joints. I believe they will be considered interesting since they serve to show how far it is possible, in some instances at least, to preserve a limb and its usefulness after severe injury and under rather unfavourable circumstances.

In an hospital situated in the midst of a large manufacturing population, cases of accident are of necessity frequent, and of these none are more so than injuries of the hand or arm requiring partial

or complete amputation. Of course in such cases the practice of conservative surgery should be carried to the utmost limit that it can be with prudence brought. To none is this of greater moment than to working men and women. Unfortunately the mill-working class, who are most frequently the subject of such injuries, are not usually in the enjoyment of the best health. They are confined many hours in close ill-ventilated rooms by day, and in yet closer and worse ventilated rooms by night, while too often their habitual food is of the most innutritious kind. The consequence is that when they incur injuries by machinery, injuries which in spite of the best directed efforts to guard against them but too frequently happen, the wounds often fail to heal kindly. Frequently a wound will close up and seem to have united by the first intention, yet after the lapse of a day or two the adhesions will break down, and more or less unhealthy inflammation be set up, not seldom accompanied by diffuse suppuration in the neighbourhood of the hurt.

I am able to submit to the readers of this Journal not only the history and treatment of each of the following cases, but also the condition of the patient at a considerable interval after recovery, when the amount of usefulness the limb was likely to attain to might be more fairly estimated.

I thought it desirable yet further to illustrate the results by lithographs copied either from careful drawings of the parts, or from photographs. The plates have been faithfully and beautifully executed.

Without further preface, then, I shall proceed to furnish the particulars of the first case.

I.—Mary Jane Waterson, an interesting child of ten years of age, was admitted to hospital under my care, May 21st, 1866. She was employed in one of the mills on "full time," contrary to the Act of Parliament. Whilst she was engaged on the morning of the 21st cleaning a spinning frame, her left hand was caught between the cog-wheels at the end of the machine. Accidents caused by these wheels are very frequent, and as may be imagined any portion of the hand which passes between them must be irretrievably injured. It often looks, in fact, somewhat as if it had been teased out like a piece of oakum.

On examining the child's hand, I found three-fifths of it in a shocking condition. The middle, third, and little fingers had been entangled, as well as the corresponding metacarpal bones. The

soft parts covering them were cut up into shreds, while the bones themselves were comminuted. The forefinger as far as the middle of the second phalanx, was also quite chopped up, the term really best fitted to express the character of the injury. In short, the entire inner portion of the hand, up to the wrist joint, was hanging semi-detached from the stump of the forefinger and the thumb which last, fortunately, was uninjured.

At first sight, it appeared as if amputation, at or above the wrist, were the only thing practicable, the more so, as the dragging and stretching of the soft parts which so frequently accompany accidents such as this, inflict injury which does not at first meet the eye, and prove the source of sloughing and secondary hemorrhage with all their attendant ills. This is more especially the case when amputation is performed too near the seat of injury.

I determined, however, if it were possible, to try to save at least a portion of the mutilated hand.

The little patient having been put under the influence of chloroform, an incision was made through the sound structures left, as near as practicable to the lacerated margins, commencing at the base of the forefinger, and extending on the palmar and dorsal aspects of the hand as high as the wrist. Only those parts were removed which, had they been retained, would inevitably have perished. The carpus, then, remained quite exposed, and there were no soft tissues available wherewith to form even a partial covering. Considering the free inter-communication of the carpal joints, the probability of severe inflammation being set up in them, possibly followed by death of the greater portion of the carpus, and at the best subsequent ankylosis of the wrist joint, should amputation not prove necessary, I thought it better to excise it at once. Accordingly I removed the entire carpus, which is a somewhat remarkable feature in this case. The ends of the metacarpal bones of the thumb and index finger were then placed in contact with the end of the radius, which, with the ulna, had not been interfered with. But it was not until I had snipped off with bone forceps the projecting extremity of the metacarpal bone of the index finger, that I could draw the edges of the skin together. The ulnar artery was the only vessel requiring ligature. Two sutures were inserted, and water dressing was applied. The forefinger was amputated so as to leave the base of the second phalanx intact. The hand and forearm were placed on a light anterior splint, and a bandage was applied over all.

On the 22nd, the day after the operation, the hand felt quite comfortable and there was little febrile disturbance. On the 23rd, fresh dressings were applied, the lint being arranged in strips like a many-tailed bandage so as to disturb the wound as little as possible, the patient going on very favourably. Nutritious diet was ordered. On the 28th, the parts were found to be healing kindly with no swelling or inflammation in the arm, and so little discharge that the wound was directed to be dressed only on alternate days. The forefinger has now almost healed. On June 2nd, twelve days after the accident, the patient was permitted to rise, and from this date until her discharge from hospital she continued to get on in every respect well. The splint was shifted by degrees a little higher up, as the parts gained solidity sufficient to permit them to dispense with its support, and also to leave the thumb and stump of the forefinger freedom to move. During the cicatrization of the wound the hand if permitted would have been drawn towards the ulnar side, but this tendency was counteracted after a time by the careful management of the splint and dressings. Six weeks after admission, namely on the 3rd July, the child left the hospital in the following condition. The wound at the wrist had almost quite healed. There was some motion in the substitute for the joint. The stump of the forefinger was quite healed, but there was little power of apposing the thumb to it. The ball of the thumb was atrophied and the joints of both fingers were very stiff. The patient was enjoined to use the hand as much as possible, for the purpose of realizing free motion in the different joints, and exercising the residuary muscles.

In September, two months after, the report is that since leaving hospital the child, through fear of incurring pain, does not fully carry out the instructions given to her. Nevertheless, she has gained a considerable amount of power. She can move the wrist freely, pick up small objects and carry a light basket. No doubt exercise will impart additional facilities in respect of using those portions of the hand which have been preserved.

I have since taken care to see that my directions were complied with, and the result has been most satisfactory. The first figure in Plate I. represents the girl in the act of knitting, which she does with rapidity and ease. It, as well as the other figure on the plate, is copied from a photograph. The hand has gained greatly in strength. The ball of the thumb has begun to get firm again. The different joints are supple, the motion at the wrist is almost as free as if the joint were yet intact, and there is considerable power of apposing

Fig 1



Fig 2





the forefinger to the thumb. The child is able to pick up either an orange or a pin indifferently. In short she is possessed of an extremely useful, if not a perfect member.

The second figure in Plate I. represents, on a larger scale, the portion of the hand which has been preserved, and the parts which have been removed. The articulated bones forcibly display how very considerable was the portion of the hand which had been lost. The child's arm is made to rest upon the table so as to show the details of the cicatrix, and the ordinary position which the limb assumes when at rest. The only possible alternative in this case would have been, I believe, amputation through the lower part of the forearm. The necessity for the removal of the entire carpus, and of most of the metacarpus and phalanges, under circumstances similar to those I have detailed, may not frequently arise, but it cannot prove otherwise than satisfactory to learn that even after such extensive mutilation a really useful member can be preserved, that the muscles may form fresh attachments and regain their power, and that a new and very movable joint can be substituted for the wrist. With time, too, and exercise this fragment of a hand will yet further improve in availability and strength.

II.—Early on the morning of the 13th May, 1865, I received a summons to proceed to hospital as a case had been admitted from one of the mills requiring amputation of the forearm. On my arrival, the patient was placed upon the operating table, the necessary instruments were at hand, and the house surgeon, assured, from his examination of the case, that amputation was inevitable, stood ready to administer chloroform, not deeming it needful that I should even see the injury or remove the temporary dressings before the patient had been rendered insensible by the anesthetic. I thought it only right, however, to make a preliminary examination, were it only for forms sake, and on removing the strips of lint which covered the part a frightfully lacerated wound was disclosed.

Ellen Beatty, the subject of this accident, was a married woman, twenty-five years of age, previously in the enjoyment of good health, but of an anxious temperament. Her husband had been sent to jail for misconduct, and she was trying to gain a livelihood by working in a mill. That morning her left hand had been caught in a fluting machine, which caused the following extensive injury on the back of the wrist. Commencing three-quarters of an inch above the extremity of the radius, and close to the outer border of the arm, a

wound was seen extending obliquely downwards and inwards right across the wrist joint, and terminating over the bases of the metacarpal bones on the ulnar border of the hand. At its commencement the wound was comparatively superficial, and thus most of the long and short extensors of the radial carpus, and of the thumb escaped injury, but it grew rapidly deeper, and divided in its course everything else on the back of the wrist. The wrist joint, and medio-carpal articulations, were laid open. The os magnum and unciform bones were almost cut through, while the metacarpals of both ring and little fingers were completely severed.

After a careful examination of the extent of injury, and also of the manner in which it had been inflicted, I decided, in place of amputating through the forearm, to try to preserve the hand. I believed, all things considered, that there was a reasonable chance of so doing, and in case of the worst, that secondary amputation would be in reserve. I have said that I took into consideration the manner in which the wound had been inflicted. It was important to do so. A fluting machine cuts the parts rather than tears them, and the injury inflicted is usually limited to the wound itself. It is far otherwise in cases of injury occasioned by some other portions of mill machinery. I procured a splint long enough to extend from the tips of the fingers to the elbow, carefully padded it, and placed the arm upon it in the prone position. The wound was drawn together by sutures, strips of lint were placed over it and a many-tailed bandage was applied. The dressings were directed to be kept wet and cold, and the patient was removed to bed. A diet of the most nutritious kind was ordered.

Next day, the 14th the patient complained of severe pain, and had slept very badly. She was ordered an opiate draught at night.

On the 15th new dressings were applied, and so arranged that during their removal they should not in the slightest disturb the wound.

On the 17th, four days after the accident, healthy suppuration had become established. A couple of days afterwards some sloughing was observed at the ulnar extremity of the wound. The woman was now ordered a bottle of porter at dinner.

On the 24th the patient was getting on very favourably. The wound looked well, her appetite was good and she had slept well. Her own expression every morning in answer to my inquiry invariably was, "I am first rate sir."

On the 26th she reported that she had had a shivering fit during the preceding night, and her pulse had risen to 120.

On the 30th the report was that for the last few days the pulse had kept unusually high. When excited by the entrance of the surgeon and pupils into the ward it frequently rose to 140, and although often counted, it never fell beneath 120. In all other respects the patient seemed doing remarkably well. She was now permitted to go about the hospital grounds, having for some days previously been walking in the ward.

On June 11th the pulse is reported to have fallen for the first time. Its frequency to-day is 100. The wound is healing fast. The splint was shifted a little so as to leave the fingers free, and passive motion in them was begun.

On June 21st it is reported that for the last ten days passive motion not only of the fingers but of the wrist itself has been kept up, and that considerable freedom of motion was the result.

Beatty was discharged from hospital on July 5th, a little more than seven weeks after her admission. The wound was healed. No complication of any kind arose during the treatment. The wrist could be flexed and extended to a notable degree. The motions of the thumb seemed nearly perfect. The fingers were still somewhat stiff, and at the metacarpo-phalangeal joints capable of little or no motion. The patient was enjoined to exercise the hand assiduously. The results, even during so brief a period, have proved most satisfactory.

This case was during its progress a source of considerable anxiety and trouble, but the termination yielded most ample compensation. The unusual frequency of the pulse, when first observed, occasioned much uneasiness, the more especially as the occurrence of a rigor at the same time implied the possibility of blood-poisoning. No untoward accident however resulted, and the case throughout was otherwise exempt from any serious feature.

In February 1866, I again saw Beatty. It was just ten months after the hurt, and I was astonished at the amount of motion enjoyed by the hand. The two injured metacarpal bones were soldered to the carpus, but the motion in the wrist was very considerable, and she seemed to have complete control over the thumb, which she can with the greatest facility appose to the rest of the fingers. She cannot flex the metacarpo-phalangeal joints, but the motion in the other finger joints is good. She can sew and perform with ease any household task. In the mill, where she still works, one of her duties is to pick up the ends of broken threads at the spinning frame, and knot them with quickness and precision.

In January 1867 the photograph was taken, from which Fig. 1 on Plate II. has been copied. It represents the hand in an extended position, also the cicatrix of the wound. Fig. 2 represents the amount of flexion of which the limb is capable. It is very considerable, and I have no doubt the early induction of passive motion had much to do with the satisfactory result.

III.—The next case, also one of injury to the wrist, affords an example of recovery after an injury more extensive and severe than in the former instance. Samuel M'Cullagh, a man twenty-seven years of age, apparently healthy, and of temperate habits, was admitted to hospital under my care on the 19th July 1865. The accident took place in a mill in the following manner. He was trying to replace a belt which had slipped off the "drum" of a rapidly revolving horizontal shaft. This metal wheel or "drum" revolved within an inch and a half of one of the beams supporting the ceiling of the room, and the man's left hand was dragged between the two. The edge of the drum cut open the palm, while the back of the wrist was lacerated by the beam. A deep wound extended from an inch above the wrist, on the radial side, obliquely downwards and inwards to the ulnar border, terminating over the metacarpal of the little finger. Most of the soft parts on the back of the wrist were divided, but owing to the degree of obliquity in the direction of the wound, the extensors of the radial and ulnar carpus, and of the thumb seemed for the most part to have escaped. All the joints of the carpus were opened, and the bones more or less injured, whilst a wedge-shaped piece, extending through three-fourths of its thickness, was cut out of the styloid process of the radius. In the palm yet more extensive damage had been inflicted upon the soft parts. A wound, commencing in the ball of the thumb, reached as far as the hypothenar eminence, and across it, quite exposed, lay the tendons of the flexor sublimis muscle. The finger could be readily passed underneath them. The flexor brevis pollicis, and the adductor pollicis, were torn from their carpal attachments, and lay contracted in a contused mass in the angle of the wound. There was no hemorrhage.

It certainly appeared from the nature of the injury that the chance of preserving a useful hand, or any hand at all, was very slight. I determined, however, that the patient should get that chance. Simple water dressing was applied to the wounds, and a splint, was carefully adjusted so as to give support to the hand and



Fig. 1

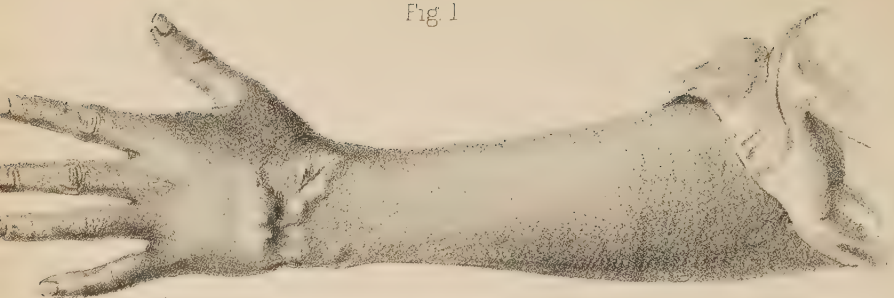


Fig. 2

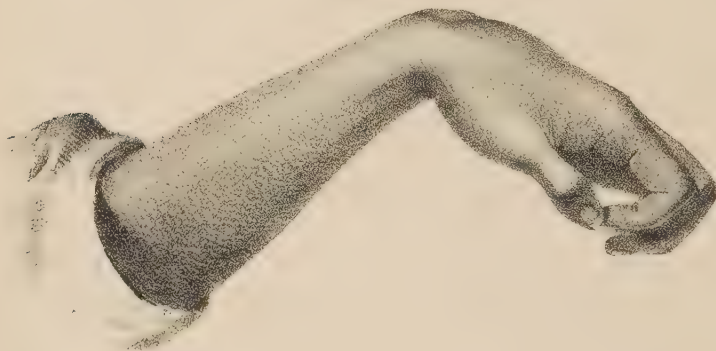


Fig. 3

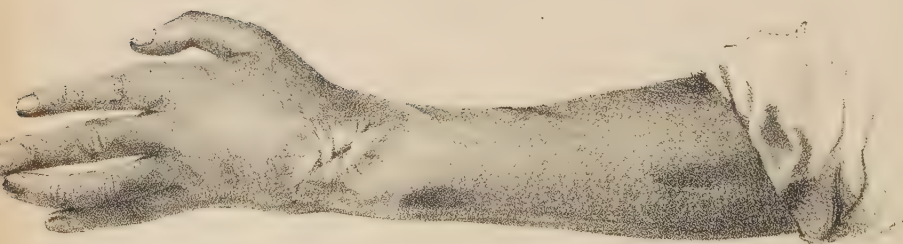
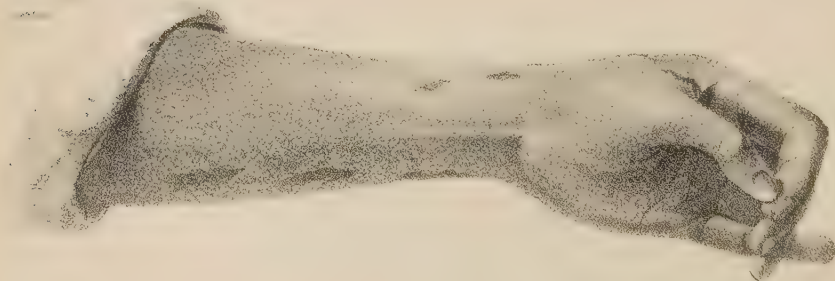


Fig. 4



wrist. The dressings were so arranged as to ensure their easy removal when requisite.

The following morning, the 20th, the pulse was 112, the tongue was covered with a whitish fur, and there was both local and constitutional disturbance. The patient complained of great pain, which proved so severe during the night that the house surgeon thought it right to administer a full opiate. The bowels being confined, I prescribed a mixture of sulphate of quinine and sulphate of magnesia in solution.

On the 21st a large slough was found on the back of the wrist on removing the dressings. The palmar wound was also in a sloughy condition. Inflammatory redness and swelling had extended half way up the forearm.

On the 24th the patient's general condition was very bad. The wounds were discharging offensive pus. The inflammation had extended above the elbow. The hand was swollen. A large poultice saturated with salt was applied so as to envelope the hand and arm, and the wounds were irrigated twice a day with tepid brine, for the purpose of cleaning away the sloughs, and fetid pus. Five grains of quinine were now exhibited thrice daily, together with four ounces of port wine, and a nutritious diet.

On the 25th, distinct fluctuation was made out on the lower and posterior part of the radial border of forearm. An incision having been practised matter was copiously discharged. The wine was increased to six ounces.

On the 26th, the patient was a great deal worse. The arm had swelled as high as the shoulder. There was distinct evidence of fresh accumulations of matter. I found it necessary to make four incisions in order to let it escape. A large quantity of pus flowed away from each of the openings, giving almost immediate relief. The cicatrices of the incisions are shown in Plate II., Figs. 3 and 4.

On the 27th, the report states that the house surgeon had been summoned to the patient about midnight, on account of smart hemorrhage having set in from one of the incisions made on the radial side of the arm. About four ounces of blood were lost, and it was found necessary to plug the wound in order to restrain the bleeding. This morning the patient was very weak, and his pulse was 100. The discharge from the openings was excessive. He had lost his appetite, and there was also a tendency to diarrhea. The inflammatory swelling in the arm and forearm had to a great extent subsided. He was this day ordered ten ounces of wine, and

a mixture containing quinine, aromatic sulphuric acid, and compound tincture of cardamoms.

On the following day, the 28th, more matter was discovered deeply seated over the upper part of the ulna. A correspondingly deep incision permitted a large quantity to escape.

On the 30th the poor man's sufferings seemed to have reached their climax. The purulent discharge was enormous, requiring the poultices to be renewed thrice a day. There was a great tendency for the pus to burrow and to form sinuses, in spite of the free incisions which had been made as soon as ever it could be detected. The excessive discharge was wearing out the strength, while the patient's distress was so great that he besought me to relieve him by amputating his arm.

After this date, however, he began slowly to improve. A large slough, notwithstanding, formed in the situation of one of the ulnar incisions, fresh accumulations of matter had to be evacuated, the arm being incised in all some nine times, and there was a return of the secondary hemorrhage on the 5th of August, which was with much difficulty restrained. Nevertheless the swelling in the parts diminished by degrees, and so did the discharge. Water dressing was substituted for the poultices.

On the 14th August, fifty-three days after the accident, the patient was able to rise for a short time. His arm was supported in a gutta-percha mould, which had been carefully adjusted. The discharge was greatly diminished, and the wounds were filled with healthy granulations.

On the 17th the report states that the man was rapidly improving. In the centre of the granulating wound on the back of the wrist, a piece of carious bone had become visible. With a pair of forceps and a slight amount of force I removed what proved to be the os magnum in a necrosed condition.

On the 23rd of September, sixty-six days after his admission to hospital, I recommended M'Cullagh to go home as I thought the healing process would probably proceed better without than within the walls of the hospital, and to report progress from time to time.

I have thus recorded the more important features of the case. It is, I think, encouraging to know that the hand may be preserved after such severe injury, and under conditions otherwise by no means favourable. The diffuse inflammation and suppuration which had to so serious an extent ensued, form a striking contrast

to the preceding cases where there was nothing of the kind. Sloughing, secondary hemorrhage, and tedious healing, were all present and proved sources of much anxiety. No doubt the injuries done to so many tendinous structures, to a certain extent explain the severity of the symptoms. But doubtless a bad and insufficient dietary, with long hours of work, had also exerted their evil influence.

When M'Cullagh left the hospital, and for some time afterwards, his hand was almost useless, but he has now long since returned to his occupation, and the parts have gained very considerable power of motion. The wrist joint is ankylosed, and the little finger remains powerless, being capable of neither extension nor flexion. Nevertheless, in spite of these, and of the injury done to the muscles by the diffuse suppuration in the forearm, as well as the division of the principal extensor tendons, and the laceration and exposure of the flexors in the palm, the hand enjoys a wonderful amount of power. M'Cullagh is now, some eighteen months after the accident, able to perform his daily routine of duties nearly as well as before, and no artificial substitute, were it even within his reach, could afford him one half the facilities he now possesses. Fig. 3 on Plate II. is copied from a photograph, and represents the hand extended. It shows the cicatrix of the wound of the wrist, and the marks of the incisions, and sloughs. Fig. 4, represents the hand flexed. The thumb and three fingers can be apposed, but not the fourth finger. The scars of a portion of the palmar laceration, and of the incisions made on the front of the forearm, are all visible.

IV.—The fatal result of the following case serves to illustrate the serious character of compound injuries of the ankle joint. Between this and the accident next described there are many points of resemblance. In the first the foot was completely displaced outwards and the ankle inwards, with an extensive wound across the internal malleolus, while in the second case the converse occurred, and the wound occupied the outer side of the joint. The injuries happened in both instances to men of somewhat similar age, habits, and constitution.

On the 30th August, 1865, Andrew Mullan, a labourer, 39 years of age, of spare frame and healthy appearance, was admitted to one of my wards. Whilst at work on the railway, he was struck on the outer side of the leg, just above the ankle, by a beam swinging round in a crane. The foot and heel were at the same time caught

on the inner side by the machinery, and the result was, that the ankle was forcibly dislocated inwards.

On examination, I found a wound extending from the front of the ankle on the inner side to the margin of the tendo-Achilles. The internal malleolus, which was fractured, protruded. The fibula was comminuted about three inches above its extremity. The foot was everted and abducted, and the tibio tarsal joint so fully laid open that I could ascertain by means of the finger that the articular surfaces composing it had escaped injury. The principal arteries and nerves were unhurt. There was no bleeding.

Mullan admitted that he had been a hard drinker, and an excessive smoker. He looked a much older man than he really was. I thought the results of so extensive an injury in a constitution impaired by excess were not likely to prove favourable, and explained this to the poor fellow who would not permit the possibility of amputation to be even mentioned to him. The only alternative was to try to preserve the foot. The dislocation was reduced without difficulty. Wire sutures were introduced in the wound, and an internal and external splint, with a foot-piece, was applied. The pad on the inner side was arranged so as to maintain the foot in a position of slight adduction, as when Dupuytren's splint for fractured fibula is used. Simple lint dressings, wet with spirit lotion, were applied over the foot and ankle. On the 1st September, two days after, although everything was maintained in a good position, both splints and dressings had to be removed, as the parts were filled with maggots. Condyl's fluid diluted was freely used in order to prevent their recurrence. On the 7th the patient felt the limb easy. The pulse was 68. The greatest attention to cleanliness, however, and the employment of Condyl's fluid, even of full strength, proved insufficient to prevent the fresh formation of maggots which reappeared day after day with amazing fertility. After trying several means without success, I found that a saturated solution of salt and water, when used to moisten the dressings, at once put a stop to any further appearance of these unpleasant animals, thereby adding much to the comfort of the patient. Mullan's general condition did not improve, the discharge of matter was copious and unhealthy, and a slough formed over the fibula partly from the pressure of the splint. Interrupted splints, arranged so as to leave the ankle joint free, were substituted for the others, which permitted the parts to be readily dressed.

On the 12th and 13th abscesses, which formed over the outer

ankle, were opened. The suppuration from the wound is diminished. The patient is quite insensible to pain. Very little action is going on in the parts. The best diet that the hospital can give, varied according to taste, and a bottle of porter are allowed daily. A severe rigor lasting twenty minutes, and followed by profuse sweating, occurred on the 16th. The patient is now in a state of extreme prostration. The pulse numbers 68, and is very weak. The tongue is covered with a blackish brown fur, and the breath has a heavy sweetish, and peculiarly offensive odour. This I have always observed in cases of pyemia. The skin has assumed a yellow tinge. Some whiskey was now ordered, and a trial was given to the sulphurous acid treatment. The bisulphite of soda in half drachm doses, largely diluted with water, was directed to be taken every six hours, and subsequently every four hours. For two days a marked improvement took place in the symptoms, but then the rigors and sweatings returned worse than before. The pulse became intermittent. Diarrhea set in, and the stools passed were very fetid. The inflammatory swelling in the limb subsided, and all action, healthy or unhealthy, ceased. The stomach also began to reject nourishment, which it previously had borne very well. Large doses of quinine were substituted for the bisulphite of soda, opiates were administered at night to procure rest, and an increased allowance of stimulants was ordered.

Nevertheless Mullan's condition proceeded from bad to worse, the rigors increased in frequency and severity, and he began to vomit a blackish-brown fluid, not unlike what was passing at the same time by the bowels. No treatment seemed to influence the course of the malady, and on the 25th September, nearly four weeks after the accident, the man sank from the effects of blood-poisoning.

No general *post mortem* could be obtained, but on examining the injured joint the upper surface of the astragalus was found denuded of cartilage, while that of the articular surfaces of the tibia and fibula had not been wholly removed.

The point of practical importance to consider here is whether life could have been preserved had primary amputation been resorted to. I confess I think it could not. The general conditions productive of pyemia would have remained much the same, while the additional shock of amputation would probably have exercised a most injurious effect.

It may be worth while to observe that the treatment of pyemia, by the administration of sulphites, which has of late been so

strongly recommended, seems perfectly useless. I have unfortunately had many opportunities of trying it, and my experience in other cases has been similar to that in the present instance. Several times a temporary amendment was observed, but this soon passed away and the disease proceeded quite uninfluenced by the medicine or, if influenced at all, only for the worse, as flatulence, great irritability of the stomach, and diarrhea were often induced by it. The experience of my colleagues, and some of them have given an ample trial to this method of treatment, is, I may add, identical with my own.

V.—The last case to which I now wish to advert is one of compound and complete dislocation of the body of the astragalus outwards, complicated with fracture of the neck of the bone, the head remaining *in situ*.

It must be obvious, from the situation of the astragalus, deeply placed amidst the bones of the leg and foot, and surrounded on all sides by ligaments and tendons, that nothing short of great violence is capable of displacing it. The accident is, in fact, comparatively rare, and is one of the most serious, both in its character and consequences, with which the surgeon has to deal. For these reasons, and also because the best method of treatment is by no means unanimously agreed upon, I believe the history, treatment, and final result of the following case, will not prove uninteresting. Dislocation inwards of the ankle, or of its component parts, is comparatively common, but dislocation outwards is quite the reverse, and, as has been pointed out by Malgaigne, is mostly always compound.

Joseph Hamilton, a labouring man, 46 years of age, was admitted to hospital under my care on the 9th April, 1866, with dislocation of the astragalus of the right foot. For fifteen years he had been a soldier, the greater portion of the time being spent abroad. While soldiering, like most of his class, he was addicted to strong drink, and he had had attacks of yellow fever and of ague. His general health was, however, otherwise good, although he looks considerably older than his stated age.

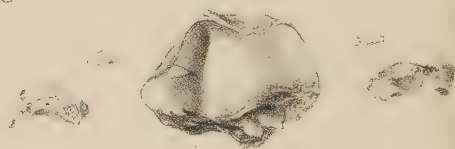
The accident happened while Hamilton was driving a young horse. The animal suddenly becoming unmanageable, the driver was thrown out on the roadside, falling on the top of some logs of timber. The fore part of the foot got wedged between two of the logs, Hamilton at the same time falling on his left side, and the



Fig. 1



Fig. 2



man's weight being thus exerted at the end of a long lever with irresistible force, dislocated the ankle outwards.

Having examined the injury I found that a wound, nearly four inches long, and two and a half inches wide at the broadest portion, extended across the outer malleolus, from the instep to the tendo-Achilles. The edges of the wound were tense and contused, and divaricated by the displaced astragalus, which partially protruded. The foot was forcibly inverted and adducted, and inclined at somewhat less than a right angle to the axis of the leg, so that supposing the patient erect the outer border of the foot would rest upon the ground, and the toes be directed towards the opposite instep. The internal malleolus was entirely hidden, its usual situation being occupied by a deep sulcus, beneath which the inner portion of the heel formed a marked projection. It was impossible to mistake the nature of the injury. In the wound on the outer side, the most prominent object was the large articulating facet of the astragalus with the os calcis. The posterior margin of this facet was fractured by the forcible rotation of the astragalus, which had also caused the bone to give way at its weakest part, the neck, the position in which fracture in such cases is generally found to occur.

The margins of the trochlea, and of the external articulating surface of the astragalus, were also partially visible. In the superior and posterior part of the wound the extremity of the fibula was bared, and hanging loose from it was the middle fasciculus of the external lateral ligament, which had dragged along with it the portion of the os calcis to which it is attached. In the anterior angle of the wound the extensor tendons were seen exposed, whilst behind and beneath the peronei tendons were stretched tensely across the wound.

Neither the tibia nor fibula was broken at any part, and this is usually the rule in this form of injury, whereas after dislocation of the ankle inwards, the fibula almost inevitably gives way, and the tibia is frequently fractured as well.

A very accurate representation of the injured limb, and of the relative position of the parts in the wound, is afforded by Fig. 1, Plate III. The lithograph is copied from a drawing taken by Mr. Molloy, one of the hospital pupils. In the interval which elapsed before everything was got ready, I made a sketch of the injury, which was subsequently copied by Mr. Molloy. It faithfully delineates the deformity and the displacement of the different portions of the foot, before surgical interference was had recourse to.

Although the patients age, appearance, and previous habits, were not the most favourable, I determined, with the concurrence of my colleagues Drs. Murney and Gordon, who were present, to excise the astragalus, and, if possible, preserve the limb.

The patient was made to inhale chloroform for a short time, and then the remaining connexions of the astragalus with the foot were readily divided with a few strokes of a scalpel, and the body of the bone was removed. It was then ascertained that the head of the astragalus remained undisturbed in its articulation with the scaphoid. It was not interfered with, nor could it have been excised without extreme difficulty, and the risk of inflicting yet further injury. The foot on being replaced was drawn up by the muscles of the leg with great force, against the under surface of the tibia, so much so that it was found very troublesome to extract some small pieces of bone which had been broken off the posterior border of the astragalus. No vessel required ligature. Strips of wet lint were applied around the injured joint and were soon saturated with the blood which oozed from the wound. The limb was then put up in Cline's splints, carefully padded in order to maintain the parts free from motion, the foot being placed in a position at right angles to the leg.

A full opiate was ordered to be administered in the event of much restlessness or pain.

Next day, the 10th, the leg was suspended in a swing splint as the patient had been restless, was suffering pain, and had obtained no sleep, the opiate notwithstanding.

On the 12th, an opening was made in the dressings opposite the injury, without disturbing the rest, which had formed a hard covering around the foot and leg. A good deal of sanious pus escaped from the wound, which looks sloughy. The patient is uneasy, has a flushed countenance, a rapid pulse, and complained much of pain in the limb. The leg was placed on the outer side, with the knee bent, on a padded splint, and an opening was left opposite the outer ankle, which arrangement permits the matter to flow away as fast as it is formed. The patient was ordered four ounces of whiskey, a bottle of ale daily, and good diet. The bisulphite of soda was also exhibited as a prophylactic against purulent infection. If this medicine be of any value, which is at the best somewhat doubtful, it is when administered as a preventative.

On the 14th, completely new dressings were put on, as a good deal of swelling had occurred. The margins of the wound, for the

breadth of half an inch all round, as well as nearly the whole external surface of the heel, have sloughed.

On the 17th, a large abscess, which had formed over the inner malleolus, was opened, and exit was given to a large quantity of unhealthy matter mixed with gas bubbles. The general condition of the patient is unfavourable. The pulse is 90, and weak, the tongue brownish, and the breath offensively sweet.

The almost inevitable formation of abscesses in these cases, on the side of the limb opposite the injury, was first insisted upon by Laugier, and therefore when such occur, should lead to their early detection and evacuation. It may be remembered that in the preceding case abscesses occupied a corresponding situation over the outer malleolus.

The wound and the cavity of the abscess were irrigated twice daily with a weak solution of Condyl's fluid to clear away the sloughs and fetid discharge. Eight ounces of wine were substituted for the whiskey, and draughts containing four drachms of the compound tincture of cinchona in two ounces of the infusion were administered thrice daily. The bisulphite of soda was continued in thirty grain doses.

19th.—Since last report, the patient has been in a very bad way. His general condition is symptomatic of blood-poisoning, the skin is yellow, and there is profound depression, while the pulse has risen to 104, and become intermittent. To-day, there is subsultus tendinum, and the patient has had a sweating fit not accompanied, however, by a marked rigor. The discharge of fetid sanious pus, mixed with air bubbles, is very copious. The patient has lost his appetite. A solution of chloride of zinc, five grains to the ounce, was daily injected into the internal and external openings as an antiseptic, with the best effect. The wine was increased to sixteen ounces in the day, and nutriment in a concentrated form was administered in small quantities frequently.

On the 20th the condition of the patient, although still most critical, seemed decidedly improved. He appears to be battling successfully against the septicemia, which there is but too good reason to suspect exists. What effect, if any, the treatment employed may have had in inducing this favourable change I am not prepared to affirm.

The next day the report is still better, the discharge has diminished in quantity, and improved in quality. The sloughs are clearing away, and the unhealthy action is arrested. Upwards of two inches of the fibula are exposed.

Everything now went on satisfactorily. The bisulphite of soda was omitted, but the cinchona draughts were not. The appetite had improved greatly, and on the 30th April the limb was in such a promising condition that it was removed from the splint, and placed upon a cushion. The wounds were dressed with spirit lotion, and the chloride of zinc injections discontinued. Claret was substituted for the port wine. The dressings still require to be renewed twice a day on account of the quantity of discharge.

A small piece of bone which proved on subsequent examination to be a portion of the posterior aspect of the external malleolus was removed on the 15th May from the original wound. Healthy granulations have filled up the wound, which is much reduced in size. On the inner side it was necessary to cut open a sinus at the lower end of the tibia as the pus showed a tendency to burrow up the limb.

Until the 28th May Hamilton was getting on very well, and an attempt was made to change the position of the limb from the outer side on which all along it had rested and which was suffering from the continued pressure, to the erect position. The change, however, caused very great pain, and a rigor due, as it seemed, to the suffering, was induced. The leg, of course, was replaced. For the next ten days afterwards, the patient's condition seemed almost desperate. Intense constitutional disturbance set in. Three or four rigors, each lasting about three-quarters of an hour, and followed by colliquative perspirations, took place. The pulse rose to 110, and became again very intermittent. The discharge of matter was excessive. The foot and ankle became swollen and sodden, and bare bone could be felt with the probe through the openings over both the inner and outer ankle, which freely communicated with each other across the joint. Altogether the man was so much exhausted by pain, irritation, and by the profuse discharge, that life was greatly endangered. On the 6th June the probable cause of most of these untoward symptoms was discovered in a large purulent track extending along the lower three-fourths of the fibula. I made a very free counter-opening over the middle of the shaft of that bone which allowed a great quantity of matter free exit. It had probably been contained in one of the muscular sheaths. The bone was not exposed. The patient obtained immediate relief, all serious symptoms shortly subsided, and he speedily gained strength. Three small abscesses were afterwards opened in the foot, and a piece of bone was extracted on July 11th from the internal opening, which proved to be a

portion of the anterior border of the malleolus of the tibia. On the 25th of June the patient was permitted to rise for the first time, the leg and foot being supported upon a stool. His recovery went on without interruption. The discharge and the swelling of the foot diminished, and the wounds gradually healed.

On the 27th July, 109 days after the accident, the man was discharged from hospital in excellent general health. The original wound had contracted to the size of a sixpenny piece. On the inner side was a granulating surface, an inch and a half long, by half an inch wide. The discharge was very slight. The foot and ankle were still swollen, and the former is firmly ankylosed to the leg. The patient can bear some weight upon his foot, but is compelled to use crutches.

I have extracted from a detailed account in my report book the most important particulars of the case. On two occasions the poor fellow was on the brink of death from the serious effects of the injury, but he finally and completely recovered, and will for the remainder of his life enjoy the use and benefit of the foot which has been so happily preserved.

Three matters of practical moment are suggested by the consideration of the history just narrated. First, would it have been practicable or proper to have reduced the astragalus. Secondly, should the head of the bone have been removed as well as the body, a practice recommended by some, and thirdly would it have been more for the patient's advantage to have removed the foot in the first instance at the ankle joint, or performed amputation even higher up, a course still advocated by several distinguished surgeons, amongst others by Chassaignac, Guersant, Tufnell, and by Begin who says:—"J'ai vu plus d'un malheureux à qui des jambes avaient été ainsi conservées, regretter la liberté de mouvement, la sûreté et la facilité de la marche, dont jouissaient ses camarades, porteurs de jambes de bois."

These are points upon which experience alone can decide. With regard to the first, the amount of force exerted by the powerful muscles of the leg in drawing the foot against tibia would have rendered the reduction of the astragalus difficult, if not impracticable, and necrosis must inevitably have followed, in consequence of the fracture at the neck having separated the portion where the nutrient vessels mainly enter, and the bone being also displaced almost entirely from its other connexions.

This case, so far as it goes, establishes the propriety of leaving

the head of the bone undisturbed. A surgeon who thought that to the dangers of compound dislocation, those of compound fracture were likewise added by fracture of the neck of the astragalus failed, on one occasion, in his attempt to remove the head of the bone in a case of dislocation of its body outwards, and the patient subsequently died. To do so, in fact, is as unnecessary as it is difficult.

The third question, that of the relative merit of primary amputation and of extirpation of the astragalus, may be considered in connexion with the result in Hamilton's case. I saw my patient in the March of the current year, eleven months after the accident, in the following condition. The wounds were long since quite healed, the swelling in the limb had subsided, and there was neither pain nor uneasiness in it. The joint was quite ankylosed, but there was already some compensating movement in the medio-tarsal articulations. The most important fact however is that Hamilton can go about without the assistance of a stick, with comfort to himself, and with only a slight halt. He is daily gaining fresh power. The limb on measurement appears shortened one inch, but the man does not find it necessary even to wear a high heeled shoe. The second figure on Plate III. represents the foot in its present condition and also the portions of bone that were removed from it. Plate IV. copied, as well as the preceding figure, from a photograph, serves to give an idea of Hamilton's general appearance and age, and demonstrates how little appreciable deformity remains, and how little the functions of the foot have been impaired by one of the severest injuries which could have befallen it. I do not think a result such as this has been attained at too great a cost, although as was said by Hildanus of his case published in 1608—which is, I believe, the first upon record of extirpation of the astragalus for compound injury—"Curatio difficilis fuit dolorosa atque longâ."

It is a saying oft quoted, but none the less true, that it is better to live with three limbs than to die with four. In other words the safety of human life should be paramount to every collateral consideration. It has, however, I think been established by Broca in his exhaustive papers on dislocations of the astragalus, and his views are endorsed by Malgaigne and others, that primary excision of the astragalus for dislocation of the bone is less dangerous than primary amputation performed for a similar injury, while secondary excision of the bone is hardly dangerous at all. Broca has collected 86 cases in which the astragalus was excised. In 59, immediate removal of the bone was had recourse to, with a fatal result in 17 instances.



ART. XV.—*Diseases of the Eye in Cerebro-Spinal Meningitis.* By
HENRY WILSON, F.R.C.S.; M.R.I.A.; &c., &c.

AMONGST the complications of cerebro-spinal meningitis, affections of the eye and its appendages are not at all unfrequent, and numerous examples have occurred during the prevalence of that disease, which has been, and still is, unhappily epidemic in this country.

The *eyelids* sometimes swell enormously, and present the appearance witnessed in purulent ophthalmia or suppurative inflammation of the eyeball. This condition of the lids is, as a rule, indicative of intense inflammatory action within the globe; they are sometimes found retracted, so that a part of the globe remains exposed. This exposure of the globe is, I think, analogous to the *lagophthalmus cholericus* witnessed occasionally in cholera, and is accounted for by the orbicularis muscle being paralyzed, and by the rapid atrophy and lessening in bulk of the adipose tissue of the orbit, in consequence of which the eyeball falls backward; the eyelid, losing its natural support, falls backward into the hollow produced between the globe and the orbital margin. I am inclined to think that there may be also a spasmodic retraction of the upper lid. A medical friend informed me recently of a very rapid case of cerebro-spinal meningitis to which he was called, but which had terminated fatally before he arrived. In this instance the upper eyelid on one side had remained wide open and drawn upwards, even after death; and when pushed down and placed *in situ* returned to its abnormal position with a jerk.

Conjunctivitis has been frequently observed, and is recorded as of constant occurrence in some epidemics abroad; it is either of a mild character, with scanty mucous secretion, or of a severe type, with profuse purulent discharge.

The *cornea* is often the seat of inflammation; it may become ulcerated from enervation and exposure to the atmosphere as occurs in cholera, or it may be the seat of interstitial deposit, and it may be occasionally so extensively infiltrated with lymph as to obscure completely the anterior chamber and iris.

The *pupil* frequently remains quite normal, it is often oval from above and within downwards and outwards, or it may be sluggish, and be slightly influenced by light; it may be contracted or dilated, and may vary; thus, at one period of the day it may be dilated, while at another it will be contracted.

The *anterior chamber* is sometimes found partially or wholly occupied by lymph or pus.

The *choroid*, *iris*, and *ciliary body* are the structures most frequently attacked; these parts (which, virtually are one and the same continuous structure) become inflamed, infiltrated, and swollen, and pour out an exudation of serum, lymph, or pus. The effusion may be between the choroid and retina, and cause separation of the latter, or into the vitreous chamber, or into the chamber of aqueous humour. The iris may be primarily or secondarily attacked; it is seen discoloured, with lymph or pus on its surface, the pupil contracted and blocked up with exudation matter. As a consequence of this the capsule of the crystalline lens becomes opaque and the pupil adherent to it. It will be readily understood how blindness must almost inevitably ensue on these processes. The premonitory and concomitant symptoms of this chorido-iritis may be mild or severe, and consist in zonular vascularity of the globe, œdema and swelling of the eyelids, chemosis of the conjunctiva, opacity of the transparent media, or even temporary protrusion of the eyeball.

The following very brief notes of a few cases may illustrate the above remarks:—

1. A boy, aged thirteen, attacked, in 1866, with cerebro-spinal meningitis, for which he had been treated by the family physician by leeching, blistering, and mercury; three days afterwards the eyelids swelled, the conjunctiva became vascular and red, and the cornea subsequently became hazy. A week after the commencement of the disease, when I was called in in consultation, the cerebral symptoms had greatly subsided on each side, the eyelids were slightly swollen, the conjunctiva somewhat chemosed, the cornea presenting parenchymatous keratitis, completely opaque, and of a yellowish grey colour; the epithelial layer, however, was clear and polished, but all the deeper lamina infiltrated with lymph in an annular manner; thus the centre of the cornea was perfectly opaque; and external to this were alternate circles of dense opacity and semi-transparency; the anterior chamber and iris were quite invisible, even by focal illumination; the boy had barely perception of light. A mercurial cap was ordered; iodide of potassium, and bark and claret, and sulphate of atropia solution to be dropped into the eye three times a day. I saw the case several times subsequently in consultation, and on one occasion found some pain and

effusion in the knee joint. In a week's time the cornea began to clear, and the pupils were found irregularly dilated, with membranous bands stretching across; the fundus of the eye was quite obscured, and gave no reflection of light on ophthalmoscopic examination. Bromide of potassium, and bark, and change of room, were ordered, and the boy rapidly improved. Three months subsequently I found numerous patches of pigment on the capsule of the lens, and points of adhesion between the iris and capsule, and two or three narrow annular and semicircular opacities in the cornea; the optic disk and a few vessels definable on the left fundus, but the right fundus obscured. With the left eye the boy reads small type, whereas with the right he can only see large objects.

This case, of almost complete infiltration of the eyeball with lymph, illustrates well the very great advantages of atropia; for had it not been employed blindness must have been inevitable, as the pupil would have remained adherent to the capsule, which would have become opaque.

2. A boy, aged two years, under the care of Professor M'Dowel, in the Whitworth Hospital, with cerebro-spinal meningitis and spots over the body. About a week after the disease commenced the lids of the right eye swelled, the conjunctiva became very red and chemosed, and vision extinguished. When the child was admitted the spots had disappeared; the cornea was completely normal; the iris discoloured and adherent to the opaque capsule. A week subsequently got a relapse of the inflammation, and the surface of the iris became covered over with lymph; this subsided after a few days; the eye is quite blind.

3. A girl, aged eleven, under Professor M'Dowel, in the Hardwicke Hospital. Eight days from the first attack of the disease the right eye was attacked with violent pain; iritis commenced, and lymph was effused into the anterior chamber, and vision almost immediately lost: the lymph was quickly absorbed, and the iris became discoloured, but the pupil, although not adherent, was inactive either to light or atropia. A fortnight after this ocular attack she got another attack; the lids swelled greatly; there was intense chemosis and great pain; and after a couple of days the cerebral symptoms became very much worse, and she became comatose. She finally recovered, but the globe collapsed about a month after the eye was first attacked. This, I have no doubt,

was a case of chorido-iritis, with effusion, destroying the integrity of the retina. I was not, however, able to make an ophthalmoscopic examination.

4. A female, aged nineteen, under the care of Dr. Banks in the Hardwicke Hospital. When admitted, a week after the attack of cerebro-spinal disease had commenced, the right eyelids were somewhat swollen and closed, and a muco-purulent discharge oozing from between them; a circular ulcer was situate at the centre of the cornea, and a good deal of zonular vascularity existed. This girl recovered completely, and has excellent vision.

5. A man, aged twenty-one, with cerebro-spinal meningitis and large dark-coloured petechiæ, in the Hardwicke Hospital, under the care of Dr. Gordon, had intolerance of light from the commencement of the illness. On the fifth day the right cornea became hazy, and on the seventh day opaque, and commencing to ulcerate. The opacity appeared to be confined to the external epithelial layer of the inferior third of the cornea, and the adjacent conjunctiva was dry and hazy; the upper part of the cornea was quite transparent and free from all disease, and the internal structures of the globe were healthy. As the patient lay in bed, asleep or awake, he presented a remarkable appearance; for, while the left eyelids were naturally closed and the globe concealed, the eyelids on the right side remained open, exposing that portion of the cornea which was the seat of the opacity. The eye was sunken, and a deep sulcus existed between it and the orbital margin, into which the upper eyelid had fallen; there existed also some paralysis of the orbicularis muscle; and during the patient's convalescence slight facial paralysis was remarked; the man appeared unable to close the eyelids. On the fifteenth day effusion occurred into the knee joint. A thin light compress bandage was applied by Dr. Gordon over the right eye, and the cornea became transparent. I regard this case as identical with *lagophthalmus cholericus*.

A remarkable feature in all these cases is that the right eye was the one affected.

Amaurosis is not an uncommon sequence of cerebro-spinal meningitis, and is due to disturbances within the cranial cavity and pathological changes in the cerebral substance; it may be temporary or permanent.

The disease most frequently met with, and most fatal to vision

in this epidemic is, according to my observation, acute and rapid choroiditis, with effusion; and I am inclined to attribute that condition to metastasis, similar to what I have seen occur in puerperal fever and other pyemic affections, where not only the eye but the joints and other localities were the seat of infiltration.

The only local remedy that is of service is the sulphate of atropia, which should be employed twice or three times a day. As far as the general treatment is concerned, it should be similar or subservient to that adopted for the original malady. Practitioners are, I believe, still at variance as to what that should consist in. I may remark, however, that opium has been found highly efficacious in some of the Continental epidemics, and I have seen it produce undoubtedly the most beneficial effects.

ART. XVI.—*On the Form of Depraved Appetite known by the Name of Pica.* By ARTHUR WYNNE FOOT, M.D., T.C.D.; Fellow of the King and Queen's College of Physicians. Read before the Medical Association of the College of Physicians.

HAVING lately had under my observation some instances, in children, of the diseased condition of appetite called pica, I was led to enquire into the causes of this strange propensity to swallow substances universally admitted to be of an innutritious character. Although the name of pica applied to this depraved form of appetite is an old one there is not much information on the subject in books; and, therefore, the remarks on this affection by Dr. F. Battersby,^a Sir D. Corrigan,^b and Dr. Wm. Moore^c are the more interesting and valuable. The term applied to this affection is borrowed from pica, the Latin name for a chattering, greedy bird, supposed to be either the jay or magpie. The bird is mentioned in the *Aves* of Aristophanes by its Greek name, *κίττα*, which word also bears the abstract signification of the longing of pregnant women, a false appetite, a craving for strange food. The list of substances which have been eaten in pica is a very extensive and miscellaneous one: comprising clay, sand, cinders, lime in various forms, slate-pencil, coal, twine, brick, pottery, sponge, and many other things. This

^a Dublin Quarterly Journal, Vol. vii., p. 316.

^b Dublin Hospital Gazette, Vol. vi., p. 225.

^c Dublin Hospital Gazette, Vol. viii., p. 33.

form of depraved appetite is not confined to the period of childhood, it has also been observed in adult males, in pregnant women, and in females suffering from suppressed or deranged menstruation, particularly about the time when that function is first established.^a Under the name of pica, Paulus Ægineta, in his first book on hygiene, refers to the diseased appetite which may occur at certain periods of pregnancy, when, he says, women have a desire for complicated and improper articles, such as extinguished coals, cimolian earth, and many more such things; and adds, that the affection is so called either from the variety of colours which the bird, pica, possesses, or from its being subject to this complaint. Volpato, who has described the pica endemic in certain parts of Italy under the name of allotriophagia^b (ἀλλότριος, φαγῆν), shows that, in early life sex does not predispose to this disease, since, of 226 cases which he collected, 111 were males and 115 female. In this country the affection among adults is almost wholly confined to females, chlorotic and pregnant women being the usual examples. In twenty cases Volpato observed that the disease was hereditary, having been transmitted to their offspring from parents themselves subject to it. Pica is to be distinguished from another morbid condition of the appetite, bulimia, the subjects of which, under the influence of ravenous hunger, will devour, almost indiscriminately, whatever presents itself, provided it be in any degree of a nutritive character. Burserius, in his *Instituta Medecinæ*,^c draws attention to this distinction. In bulimia quantity is generally the desired object; in pica the quality of the food seems a point of selection with the appetite; hence, in the former organic matter in some shape or other is sought for; in pica it is usually mineral matter, often of a completely inert nature, such as silica, talc, aluminum, which is swallowed. Bulimia occurs in its most extreme degree after long involuntary fasting, when substances are willingly devoured which nothing but the love of life would otherwise induce people to eat; while pica has been observed in the well-fed as well as among the poor, and may even exist with anorexia and distaste for the usual food. The aberrations of appetite observed from time to time in the insane seem related to bulimia rather than to pica, since their desires are not confined to food of a mineral nature, but filth of every kind, the materials of their dress or bedding, or even

^a Montgomery—Signs and Spts. of Preg., p. 280.

^b Brit. and For. Med. Ch. Rev., No. iii., p. 254.

^c Vol. viii., p. 23.

their excrement is occasionally eaten. The lower animals are subject to eccentricities of appetite, which, in Germany, have been described under the name of *pica*, and which almost always indicate disease. Sheep, under certain conditions, exhibit a tendency to eat the wool off themselves and each other; hair concretions form in their stomachs, in consequence, and they do not thrive; they have to be separated and the wool smeared with bitter and disagreeable substances.^a Among the early symptoms of rabies in sheep and dogs a depraved appetite is conspicuous. Lambs, soon after they are weaned, are subject to a disease in which the blood becomes very watery, the red corpuscles often scarcely amounting to one-fifth of their normal quantity; and such lambs have been observed eating sand in large quantity; as much as three pounds of sand has been taken from the cecum and other intestines, the latter being nearly blocked up with it. Dr. Crisp,^b in reporting upon this "lamb disease," considers that the tendency to eat sand is similar to that observed in chlorosis; and that it is connected with a vitiated condition of the blood.

Limiting, then, the term *pica* to those cases of depraved appetite in which the substances craved for are, for the most part, of an earthy or mineral nature, the next considerations are the effect which the practice of eating such substances has upon the body, how the habit is acquired, and how the tendency to it is to be obviated. The mass of evidence on the subject is wholly against the wholesomeness of the custom. The example of certain clay-eating tribes is often quoted in support of the habit; but an investigation into the results of *pica*, in places where it is endemic, proves that it is most injurious. The period during which the Ottomacs eat their ferruginous loam is not long; and Humboldt states that other tribes in South America do not fail to become diseased from this habit. The emaciating effects of a clay-diet are well known to the Javanese, among whom leanness is considered fashionable; and to make themselves thin the men and women—especially the pregnant women—are said to eat toasted cakes, made out of a reddish clay which contains iron.^c John Hunter, writing on some of the diseases of the negroes in Jamaica, where *pica* is endemic, alludes to their propensity to eat clay, and to its effects upon them. Dirt-eaters, as he calls them, can seldom or ever, he

^a Ed. Vet. Rev., Vol. v., p. 128.

^b Ed. Vet. Rev., Vol. v., p. 624.

^c Burdach—*Traite de Phys.*, Vol. ix., p. 260.

says, be corrected of this unnatural practice; for their attachment to it is greater than even that of dram-drinkers to their pernicious liquor. They have a predilection for particular kinds of earth at first, but in the end will eat plaster from the walls, or dust collected from the floor when they can come at no other. They are fondest of a kind of white clay, like tobacco-pipe clay, with which they fill their mouths and allow it to dissolve gradually, and express as much satisfaction from it as the greatest lover of tobacco could do. This practice is common at all ages, even almost as soon as they leave the breast, the young learning it from the old. Whatever the motives may be that induce them to begin the practice, it soon proves fatal if carried to great excess. There are instances of their killing themselves in ten days; but this is uncommon; and they often drag on a miserable existence for several months, or even one or two years. On many estates half the number of deaths, on a moderate computation, are due to this cause. The negroes subject to pica almost always complain of incessant pain in the stomach. On examination of the body after death there are frequently found in the colon large concretions of the earthy matter which they have swallowed, lining the cavity of the bowel, and almost completely obstructing the passage. The stomach has not presented the appearances which might have been expected, its interior being, usually, merely covered with a whitish viscid matter.^b

The effects of pica upon children in this country, when the habit has been long continued, are emaciation, with impeded development, anemia, constipation, sometimes diarrhea, great dulness of spirits; the abdomen feels doughy and tumid, and is often the seat of colicky pains; hard substances which have been swallowed can occasionally be felt through its parietes, and have been brought away from the colon by enemata. The stomach and intestines become tolerant of the foreign bodies introduced into them in a wonderful degree, they are rarely rejected by vomiting, and perforation of the alimentary canal very seldom occurs, except in the case of chlorotic females, where there seems, as Dr. Crisp^c has pointed out, a very probable connexion between the frequency of perforating ulcer of the stomach and the eating of such things as mortar and cinders. In a case of pica which came under my notice, where the child had been for two months in the habit of eating pieces of brick

^a Hunter—Obs. on Dis. in Jamaica, p. 310.

^b Mason on Mal de l'Estomac.—Ed. Med. Jour., Vol. xxxix., p. 293.

^c Med. Times and Gaz., March, 8, 1862, p. 253.

or broken flower-pot as well as clay, the large intestine was distended with these things, and the pieces of brick had often been recognized, in the evacuations, by her mother, who said that it was thus finding them that had caused her to watch the habits of the child; these substances had not caused any inflammatory affection of the intestine. The local effects of pica are generally less serious than the constitutional, but the irritation caused by the anomalous contents of the intestines may, as Sir D. Corrigan observes, produce symptoms resembling those which usher in tubercular meningitis, hydrocephalus, or mesenteric disease.

In considering the causes, in children, of the morbid appetite called pica, it will be useful to examine the affection as it occurs in adults, inasmuch as these latter may be expected to give a better reason for what they do than children. In the dyspepsia with which the negroes of Jamaica become affected when exposed to hardship and privations, a prominent symptom is a tormenting gnawing pain in the stomach, and it is for the relief of this uneasy symptom that the sufferer betakes himself to eating some absorbent earth which affords temporary relief; negroes had been overheard urging their companions to adopt this remedy. In the remarkable case of Mary Riordan, brought before the College of Physicians many years ago, by Dr. Pickells,^a it is stated that she had been in the daily habit of eating large lumps of chalk, having found it to mitigate a burning sensation in her stomach. Her father and brother, who were coopers, and used large quantities of this substance in their trade, were accustomed, in compliance with her importunities, to provide a regular supply of it each evening. At last, however, they desisted, having become alarmed upon consideration of the enormous quantity she consumed. She then regularly laid out whatever money she could command, in purchasing chalk privately, and those parts of it which were harder than others she contrived to soften by steeping in milk. The church-yard clay, the effects of which have made this woman notorious in medical literature, was swallowed from religious motives, and this act was not specially connected with her depraved appetite. Prepared chalk, taken in daily doses of half an ounce, has been found, in some cases, the only means of relieving excessive acidity of the stomach during pregnancy. (Ashwell on Parturition, p. 169). The capability of most of the substances eaten in pica to neutralize or absorb

^a Dr. Pickell's Case of Insects in the Stomach. Trans. of the Med. Assoc. Vol. iv., p. 192.

any excess of acid secretion in the stomach, and to appease the uncomfortable sensations it gives rise to, supports the suggestion of Burserius^a as to the connexion of this disease with what he called an "aciditas esurina." Various facts connected with the occurrence of pica in children tend also in the same direction. Of fourteen cases of pica observed by Dr. Battersby,^b the average duration of suckling was twenty months, six of the cases were suckled two years and upwards, and one of them weaned at one year, was continued at the breast for seven months, during the utero-gestation of a succeeding child; the great tendency of milk, in protracted nursing, to be decomposed in the infant's stomach into butyric and lactic acids is well known; these fourteen children eat greedily of coals, cinders, ashes, lime off the walls, dirt, paper, and even their ordure. Another cause of excess of lactic acid in the stomach, is the imperfect assimilation of sugar; and among the cases of pica observed by Sir D. Corrigan, is one in which this depraved condition of the appetite was traced to the acquired habit of eating sugar. On this child's having been weaned and transferred to the nursery, the nurse in charge gave the child lumps of sugar, with the object of keeping her quiet at night. The morbid appetite for sugar increased to such a degree that the child would at last take no food, even broth, unless loaded with sugar. From a desire to have a lump of sugar in the mouth, the child then turned to other substances, and was never contented unless she had something or other in the mouth. Clay came most easily to her, as she was frequently in a small garden; and, when in the house, twine was the next favourite for sucking and swallowing.^c Dr. Graves has described a special form of gastrodynia associated with an abnormal secretion of gastric acid, strong enough to leave, when vomited, a red stain upon blue trowsers; this acid dyspepsia is usually benefited by a combination of narcotics and alkalies. This method of treatment may be said to have been instinctively arrived at by certain tribes of American Indians, who, in anticipation of an undue secretion of acid in an empty stomach, are said to provide themselves, at the commencement of a journey in which they are likely to be short of provisions, with a paste, composed of tobacco-juice and a powder of the calcined shell of snails, oysters, and cockles, which they eat in the absence of food. There seems to be reason for

^a Instit. Med., Vol. viii., p. 23.

^b Dub. Quart. Jour., Vol. vii., p. 316.

^c Dub. Hosp. Gaz., Vol. vi., p. 225.

believing, from the results of treatment and from the history of analogous cases in adults, that pica in children is often intimately connected with an over acid condition of the stomach, this being the cause of the instinctive desire for alkaline or absorbent substances which leads to the habit of swallowing such a number of innutritious articles. The clay-eating negroes in Jamaica find that this practice relieves the almost incessant gastrodynia, from which they suffer, even more effectually than a regular supply of ordinary food, which would not be the case if these substances merely served to allay the sensation of hunger, by mechanically filling an empty stomach; and from this and other circumstances, Dr. Mason, who studied the endemic pica of Jamaica, is inclined to consider that this habit, as observed among the negroes, instead of being a disease or the cause of disease, is actually a remedy, prescribed in a rough way, the absorbent earths made use of being only injurious from the many impurities they contain.^a

The difficulty of dealing with the diseased appetite, pica, will depend upon the view taken of it by the person about to treat it. If it be regarded as a symptom of dyspepsia, with excess of acidity, it will generally prove amenable to combinations of antacids, with vegetable tonics and opiates—according to circumstances—as soon as accumulations in the intestines have been removed and existing complications attended to—due regard also being had to the difficulty of breaking off the use of what has almost become a necessity. On the other hand, if it be regarded merely as a pernicious habit or trick, and peremptorily forbidden under pain of punishment, the difficulty will be much greater; and the attempt may even fail. It has always been my impression that, in many cases, pica in children is rather an instinctive attempt, on their part, to prescribe a suitable remedy for an acid dyspepsia, though often in a form unsanctioned by medical authority than the result of an objectless habit. It is the opinion of some that the discipline of the nursery should be sufficient to correct the tendency without medical interference; but if the practice be really a mode of satisfying a peculiar want of the stomach it would be as cruel to cut off the supplies of the substances craved for, without providing an efficient substitute, as to punish a child for pulling the prepuce when it had a stone in the bladder, or for incontinence of urine while it was suffering from paralysis of the bladder. The experiment of treating pica by force has been made

on a large scale in Jamaica: blows, threats, promises, close confinement, have been employed to keep the clay-eaters from the clay which they had an instinctive desire to eat. Advantage has even been taken, on some estates, of the intense horror with which the negroes regard the mutilation of a body, and the heads of those who died from the effects of pica were cut off as an admonition to the survivors. All these methods, however, have proved ineffectual and have been abandoned. Opium, to allay the gastrodynia, a proper supply of food and vegetable tonics, with iron, have been substituted with such success that pica is now much more rare in Jamaica than it formerly was. In the district of Italy, where pica is endemic, the children, according to Volpato, are regarded as the subjects of witchcraft, and superstitious practices rather than therapeutical means are resorted to for their cure. The cases which I have seen were, with the exception of one, in the commencement of the practice, and therefore more easy to treat than those in which the habit has become confirmed, complications have ensued and the general health suffered. The administration of lime-water and milk, with vegetable tonics—the latter continued for a long time after apparent recovery—appeared to restore the stomach to a healthy condition.

ART. XVII.—*On the Value of Thermometric Observations in Typhus Fever; being a Thesis for the Degree of Doctor of Medicine. Read before the University of Dublin, on March 4th, 1867.* By THOMAS WRIGLEY GRIMSHAW, M.D. (Dubl.); one of the Physicians to Cork-street Fever Hospital; Lecturer on Materia Medica in Steevens' Hospital.

ON THE VALUE OF THERMOMETRIC OBSERVATIONS IN TYPHUS FEVER.

THE use of the thermometer as a means of diagnosis has for some time past attracted considerable attention, and has even been relied upon by some as an exclusive means of diagnosis between different forms of fever. In the *Medical Press and Circular*^a I pointed out how this instrument might be of value in determining, in doubtful cases, whether a febrile affection was likely to prove of a serious nature or not; at the same time I showed that thermometric

^a *Medical Press and Circular*, January 24, February 7 and 21, 1866.

indications must be received with considerable caution. I now propose to treat of the value of thermometric indications in a single disease, believing that the best way of utilising any observations is to confine them to one disease at a time; and having thus determined the conditions in each disease, *then* to contrast them one with the other. Having collected a large number of observations on typhus fever, I am about to state the conclusions they have caused me to arrive at, trusting that similar and more extensive series of thermometric observations may in time be made by myself and others, giving us the means of making more accurate comparisons than we have at present. Perhaps it may be said that there are already a sufficient number of observations from which to draw very decided conclusions; my experience, however, leads me to the belief that few diseases have as yet been observed so frequently and accurately as to enable us to come to such conclusions. I believe some of the most accurate and numerous observations have been made by Drs. Compton^a and Warter,^b both of whom have published valuable and interesting papers upon this subject. I must not be considered to undervalue in the least these useful additions to the thermometry of acute disease. In fact, to my mind, they are the best papers upon these matters which have yet appeared, not excepting those of Wunderlich, who usually gets the credit of introducing the thermometer into medical practice, although it has been extensively used by others, many years since; as by Dr. George Kennedy, in Cork-street Fever Hospital, and forty years ago by Dr. M'Donnell, of Belfast, whose notes of temperature in disease accumulated by thousands on loose slips of paper (described to me as "barrels full"), in utter confusion, consequently lost to medical science.

The attention of the profession, and especially of its student members, has been called to the subject of thermometry in disease by Dr. Aitken, of the Army Medical School.^c Unfortunately the range of temperature given by Dr. Aitken for typhus, in his work on the practice of medicine, is quite erroneous, as has been proved by the observations of Drs. Warter and Compton in London, Dr. Perry,^d in Glasgow, and mine in Dublin. In the *Medical Press*

^a Temperature in Acute Disease. Thesis for M.D., read before the University of Dublin. Dublin Quarterly Journal of Medical Science.

^b Remarks on the use of the Thermometer in Acute Disease. St. Bartholomew's Hospital Reports. Vol. ii. 1866.

^c Science and Practice of Medicine. London, 1864.

^d Observations on the present Epidemic of Typhus. Glasgow, 1866.

and Circular I endeavoured to account for the discrepancy between my observations and those of Dr. Aitken, by the difference in the types of fever he had met with in England and I had encountered here, but since the observations of Drs. Warter and Compton have been published, I can come to no other conclusion than that Dr. Aitken has in some way fallen into error, either by taking Wunderlichs observations as a basis, or by relying too much upon temperatures taken by others^a.

Before making any remarks upon the abnormal ranges in temperature found in typhus, I wish to refer to what I consider the normal range of health. I think we may consider 98° to $98^{\circ}5$ as the average temperature of the healthy body. Various circumstances may raise or lower it a little. It is more likely to be lowered than raised, as for instance after a full meal. I have met with several persons in whom the normal temperature seemed nearly always to range between 99° and 100° , and one or two where it seemed to be usually about 97° . I consider that $98^{\circ}5$ may be taken as the healthy standard; and I must say, I have seen no good reason to give the normal temperature so extensive a range (from $95^{\circ}5$ to $98^{\circ}5$) as Dr. Compton has done in his thesis.

With regard to the thermometric range in typhus, my observations lead in the main to the same conclusions as those arrived at by Drs. Compton and Warter. I consider the division the latter observer has made of his cases into two classes—those attaining their maximum temperatures on the 7th and 9th days respectively—of great practical value, for as I have elsewhere remarked, the former maximum indicates a more rapid recovery and less severe variety of the disease than the latter.^b

Cases I. and II. (diagrams 1 and 2) correspond respectively with these two classes of cases.

CASE I.—Was an ordinary uncomplicated case of typhus reaching

^a Since the above was written I have ascertained that many thermometers made for clinical use have altered so much after being used for twelve months, that they register two or three degrees higher than they should. This is owing to the tubes not having been kept for a sufficiently long time to allow for the contraction of the glass (which always follows their manufacture), before being graduated. I have been informed that several observers have found all their observations vitiated, owing to their having used these carelessly constructed instruments.

^b Sphygmographic Observations on the Pulse of Typhus.—Dublin Quarterly Journal of Medicine, Feb. 1, 1867.

the maximum temperature on the 7th day, and being convalescent on the 15th day.

CASE II.—Was one of typhus running a long and tedious course, reaching the maximum temperature on the 9th day, and not being considered in a state of convalescence until after the 29th day. I find that the maximum temperature is usually attained *before* the 9th day (as I have already pointed out in my sphygmographic observations on the pulse of typhus), whereas Dr. Warter considered that it is usually attained *on* that day. I think these differences are easily reconcilable owing to typhus being a more severe disease in London than in Dublin. The extreme height of the thermometer in typhus seldom exceeds 104° , occasionally reaching to $104^{\circ}5$, but only in exceptional cases rises to 105° . It is probable that in the cases I have mentioned when the normal temperature appeared to be high, the range during typhus would reach considerably above 104° .

Age has a considerable influence in modifying the thermometric range in typhus. In the young the range is higher than those advanced in life. The highest ranges I have, have been always about puberty, or between that age and twenty years, except under circumstances which I shall state presently.

In the young, the female sex has an influence favourable to a high range; the highest ranges having been always taken in girls of from fourteen to sixteen years of age, as in Case III., diagram 3, where the unusually high temperature of 105° degrees was reached on the 9th day, although the case was such as to give no serious cause for anxiety. The patient had been a healthy girl, and there was no complication in the case, save very slight bronchitis on the 12th day.

The value of thermometric indications as a guide in diagnosis, prognosis, and treatment, depends upon their correspondence with the other symptoms of the disease, and condition of the patient as to age, sex, &c.

A high range of temperature, *per se*, must not be considered an indication of danger; for instance, if it occurs in a young girl (Case III.) it is usually of little consequence, but if in a middle-aged person, or one advanced in life, it is of serious import. On the other hand a low range may be a very serious indication, as I shall presently show.

A high temperature shortly after the invasion of the disease

indicates the early appearance of the eruption, in other words, *cæteris paribus*, one of the class of cases described by Dr. Warter as having a 7th day maximum, consequently not likely to be a serious case. A later increase in temperature indicates that the case belongs to the 9th day maximum class, which in my experience are the most severe cases.

The temperature generally, though not always, rises to its maximum the day before the eruption appears, as in diagram 1, day 7. The temperature falls decidedly for one or two days before the eruption begins to fade (see diagram 1, days 9 and 10). The temperature usually hovers as it were sometimes a little above, but generally a little below, 98° before it settles at the normal standard.

It is to be noted that a range similar to that which occurs in maculated cases is sometimes found in cases without any spots, especially in children, as in Case IV. (diagram 4) which represents a case with a typhus range of temperature without any spots, but all other symptoms present. The patient was only ten years of age, and had a mother and sister ill at the same time with typhus, in both of whom the eruption was well marked.

The pulse usually varies with the temperature, about 8 or 10 beats for each degree. This rule, however, has many exceptions.

As an average thermometric range for typhus, I still think that that which I published in *The Medical Press and Circular*, and give in diagram 5, is nearly correct; if it require any modification I should say that represented by the dotted line might be considered as an amendment.

As to the significance of deviations from the usual typhus range of temperature, I consider I am justified in laying down the following propositions, the truth of which I have had frequent opportunities of verifying during my systematic and casual observations. I shall give cases in illustration of each of these propositions:—

A.—TEMPERATURES HIGHER THAN USUAL RANGE.

1. *Temperatures above 104° in middle or advanced life indicate:—**Ex. gr.*

α. A serious case—Case V. (diagram 6), which was one of severe typhus such as we seldom see recover, occurring in a heavy plethoric man, age thirty-nine years. The temperature reached its maximum $104^{\circ} \cdot 75$ on the 7th day. There was no complication in this case, but all the symptoms of typhus were so intensely marked as to cause great anxiety as to the result.

β. A serious complication—Case VI., diagram 9, occurring in large fat woman, aged thirty-eight years, in whom the temperature rose to 105° on the 12th day, although it had previously reached 104° on the 7th day, and fallen to 102.5 on the 11th day. This sudden rise was followed by bronchitis on the 13th day, which nearly cost the patient her life, and much prolonged her case.

2. *Sudden rises in temperature with eruption remaining stationary, or declining, indicate complications.—Ex. gr.*

CASE VI. (diagram 7), a boy age fifteen, although a temperature 104° had been attained on the 4th day (unusually early in the disease), and afterwards had fallen to 103° , yet on the 8th day a sudden rise to $104^{\circ}.25$ occurred, which was followed next day by severe pneumonia, the eruption at the same time beginning to fade.

CASE VII. (diagram 8), a woman aged twenty. On the 11th and 12th days a sudden rise took place in her temperature, although her other symptoms were improving, her pulse however having increased in frequency. On the 12th day I noted “nothing to account for rise in temperature.” On the 13th day she became delirious, tried to get out of bed, requiring a constant attendant to prevent her doing so. Another rise took place on the 14th day with a temporary increase of the delirium; ultimately the patient did well.

CASE VIII. (diagram 9) already referred to, the rise on the 12th day indicated severe bronchitis.

3. *Long continued high temperature usually indicates a complication, generally arachnitis or delirium, especially the latter.—Ex. gr.*

CASE IX. (diagram 10), a young woman, age eighteen, whose temperature stood at 104° at the time she came under my care, stated to be the 10th day of her illness; this high temperature was maintained until the 13th day, when she became furiously delirious, shouting, singing, cursing, and attempting to strike any one who came near her; so much so, that it was impossible to take any further thermometric observations upon her. She was treated with leeches to head, tartar emetic, and morphia. The case terminated favourably.

B.—TEMPERATURES LOWER THAN THE USUAL RANGE.

1. *A low range of temperature, other symptoms being serious, is a bad sign.—Ex. gr.*

CASE X. (diagram 11), a man aged forty-four, densely maculated with large dark spots, all the other symptoms of typhus being well marked, excepting that his mind was unusually clear. The disease ran a short course, the patient dying on the 10th day. The temperature never exceeded $101^{\circ}5$, and never fell below $100^{\circ}25$. Death in this case seemed to result from an intense dose of the fever poison.

2. *A sudden fall in temperature, other bad symptoms remaining the same, or increasing in severity indicates:—*

α . Death—in which case there is often a rise before the fatal event.—*Ex. gr.*

CASE XI. (diagram 12), a man aged thirty, with very severe symptoms, one of the most urgent being insomnia. The rapid fall on the 10th, succeeded by a rise on the 11th day, preceded death.

CASE XII. (diagram 13), a woman aged sixty, with very bad typhus, the spots large and dark, all the other symptoms severe; a fall in temperature on the 13th day, other symptoms not having improved, preceded death.

β . Complications, especially diarrhea; in fact diarrhea is the usual complication following a fall in temperature. This diarrhea may be critical as in Case XIII., or of serious import as in Case XIV.

CASE XIII. (diagram 14), a boy aged ten years; diarrhea occurred on the evening of the 12th day after a fall in temperature having been observed in the morning; this was succeeded by a slight rise the following day. The diarrhea seemed to have been critical, as the patient immediately passed to a state of convalescence.

CASE XIV. (diagram 15), a boy aged fifteen, exemplifies a severe diarrhea on the 13th day following a fall in temperature. On the

12th day again followed by well marked cholera on the 14th day. The spots remained without alteration until the cholera began to get well. A rise of temperature on the 19th day was followed by rapid convalescence, interrupted only by a parotid abscess, which gave no trouble. In this case I found the most extensive range of temperature I have ever taken, extending between $95^{\circ}75$ and $104^{\circ}5$ met with.

The details of this interesting case are given in *The Medical Press and Circular* of October 31, 1866.

There are several complications of typhus before which I have noticed departures from the usual range of temperature, as for instance, arachnitis, parotitis, inflammation of the ear, &c., but I have not systematically recorded a sufficient number of these to enable me to select examples for illustrating my statements. In each of the cases I have given as examples I had opportunities of systematically observing others similar, the only exception being Case XIV., which I have given an account of its great peculiarities.

The chief practical clinical use to be made of the thermometer is that it gives us a warning of the probable severity of a case, or the probable advent of a complication which otherwise might escape our notice, owing to the patient not being conscious, and therefore unable to direct the attention of the physician to an intercurrent disease which would soon make itself evident if the patient enjoyed the full benefit of his faculties. Thus being "forewarned" we can be "forearmed," and enabled to apply farther remedies at an earlier period than we otherwise could. As to prognosis we should always be cautious in declaring the probable result of any case when the temperature is still rising, or varies much from the typical ranges which I have indicated for the disease.

DIAGRAM I.

DEGREES FAH^T.

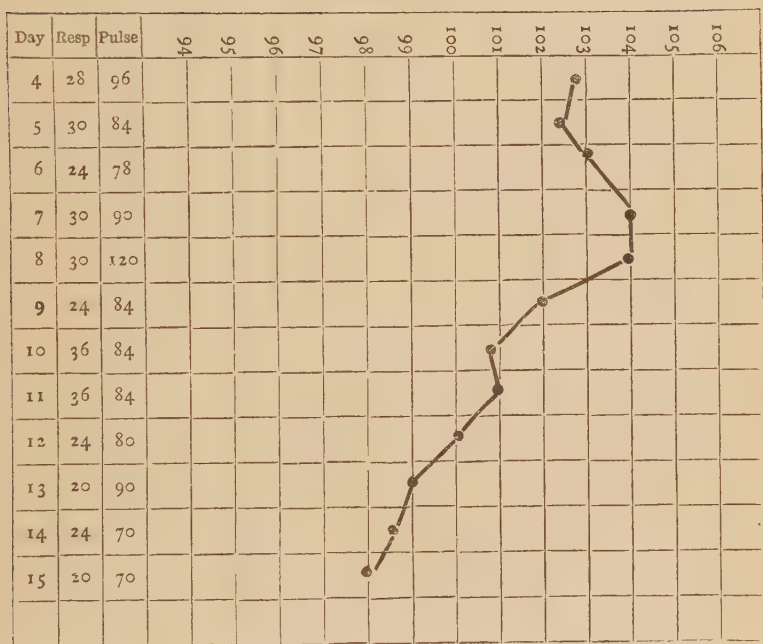


DIAGRAM II.

DEGREES FAH^T.

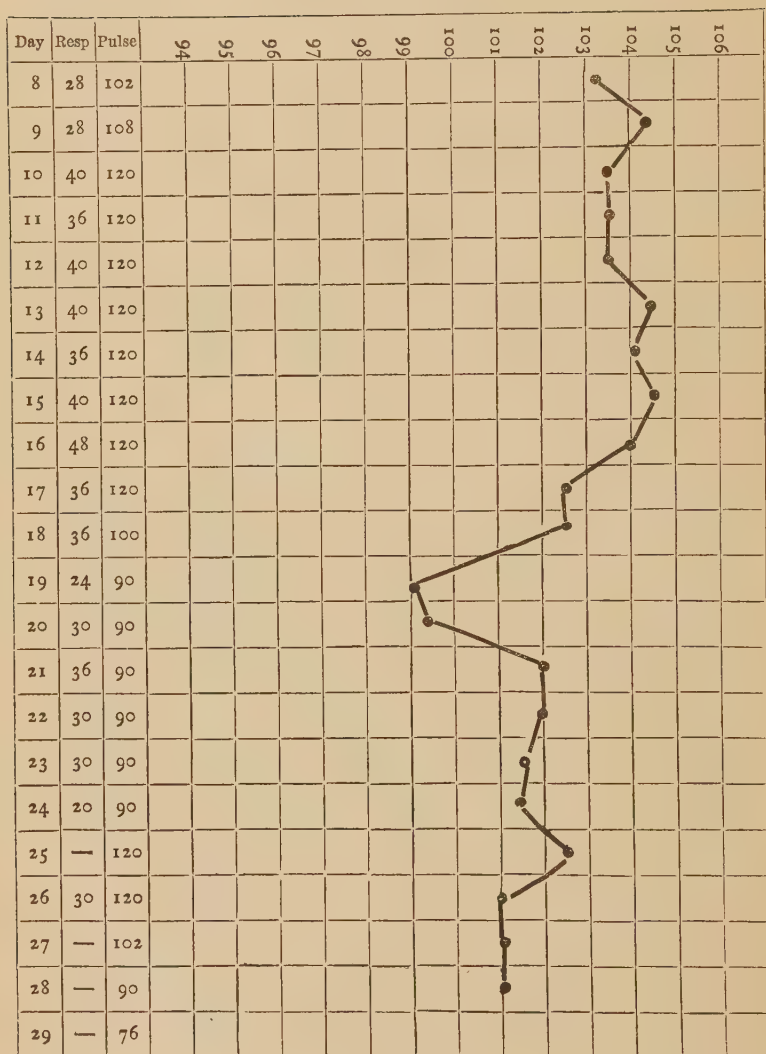


DIAGRAM III.

DEGREES FAH^T.

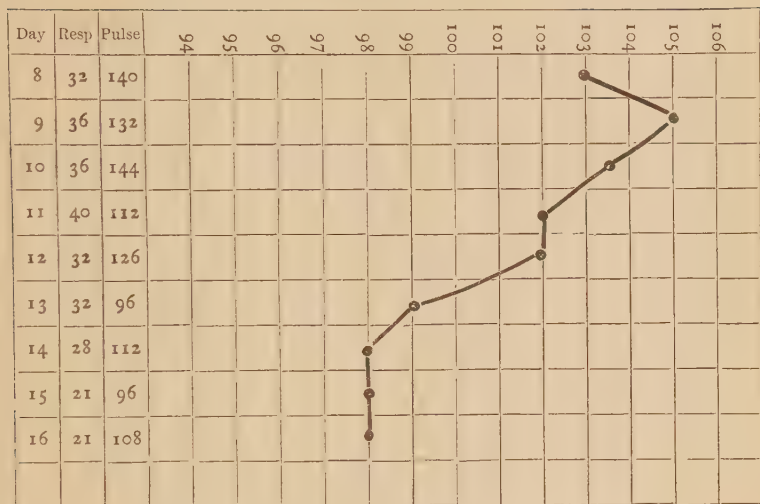


DIAGRAM IV.

DEGREES FAH^T.

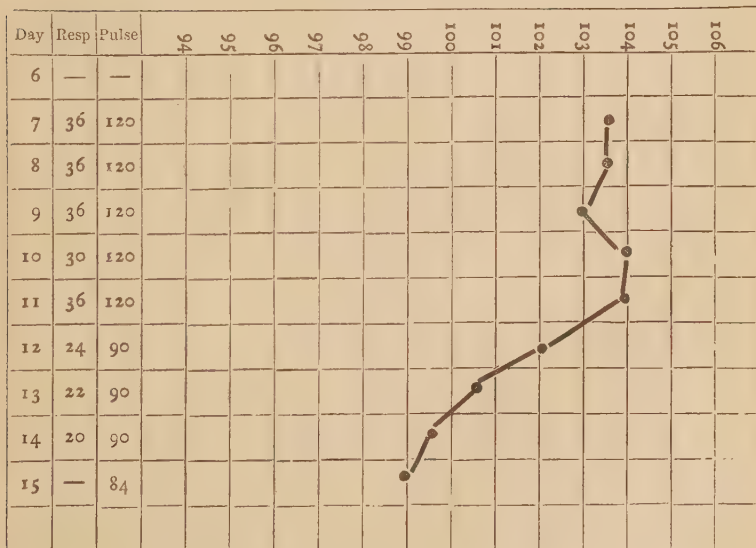


DIAGRAM V.

DEGREES FAH^T.

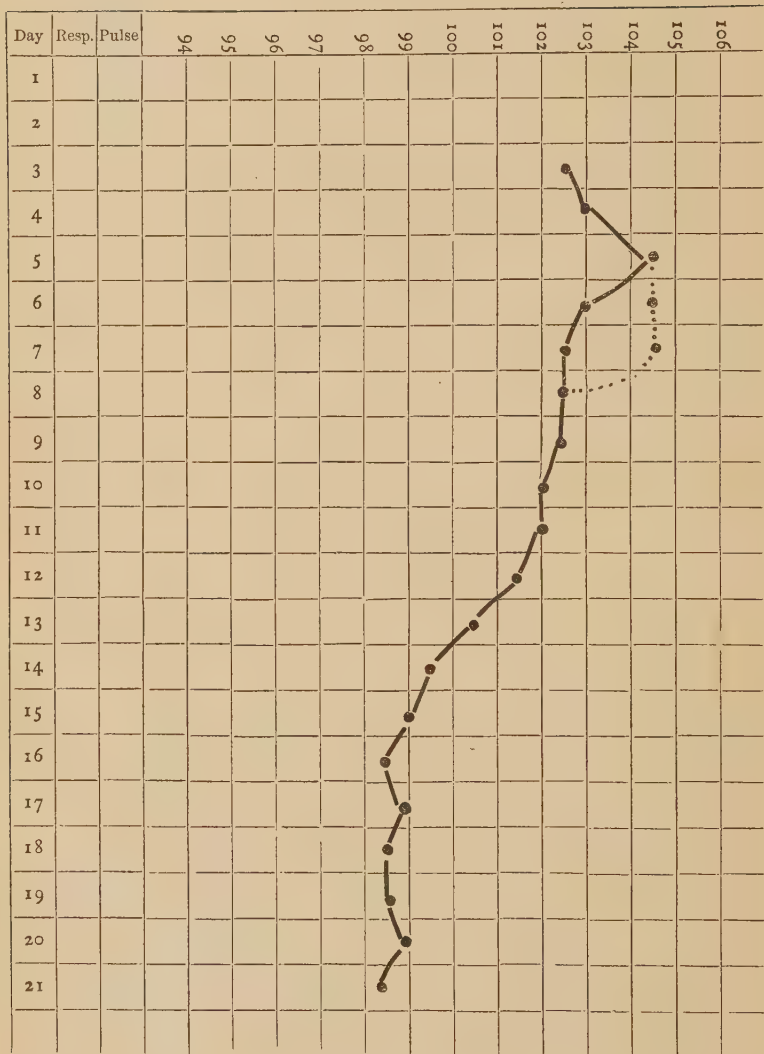


DIAGRAM VI.

DEGREES FAH^T.

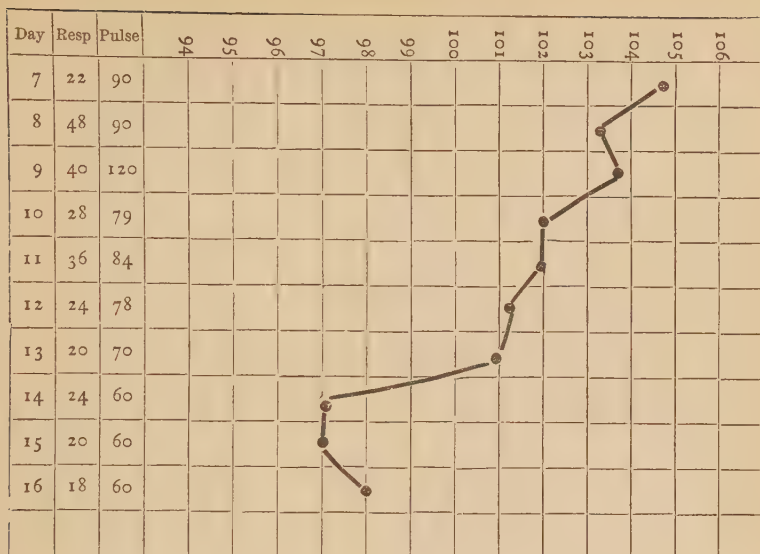


DIAGRAM VII.

DEGREES FAH^T.

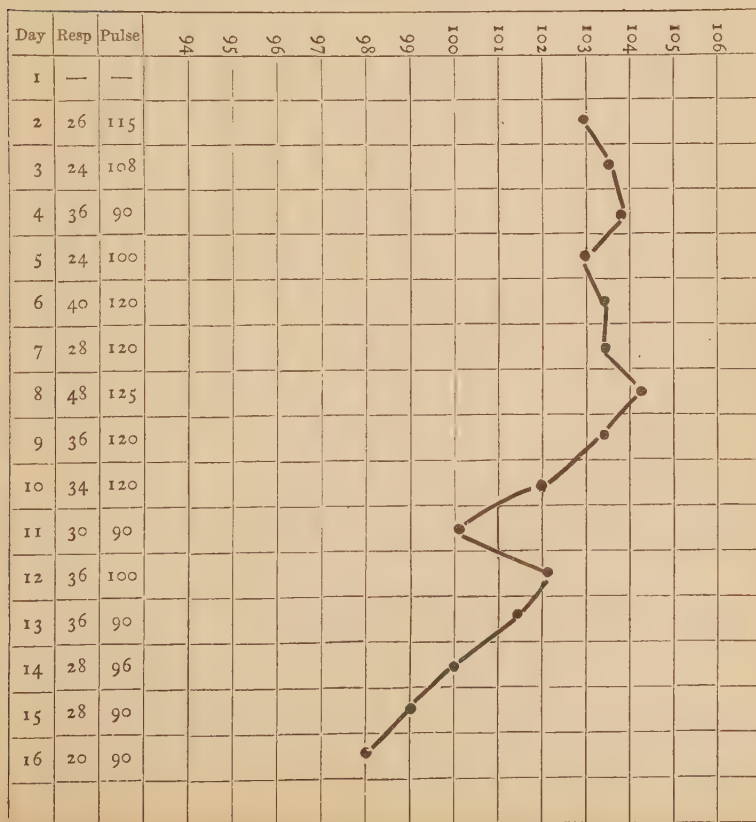


DIAGRAM VIII.

DEGREES FAH^T.

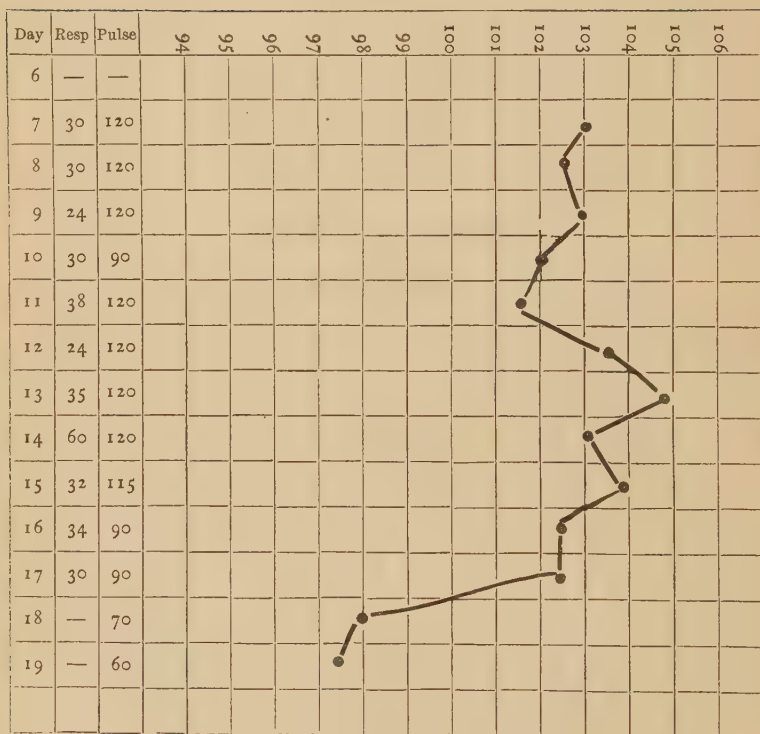


DIAGRAM IX.

DEGREES FAH^T.

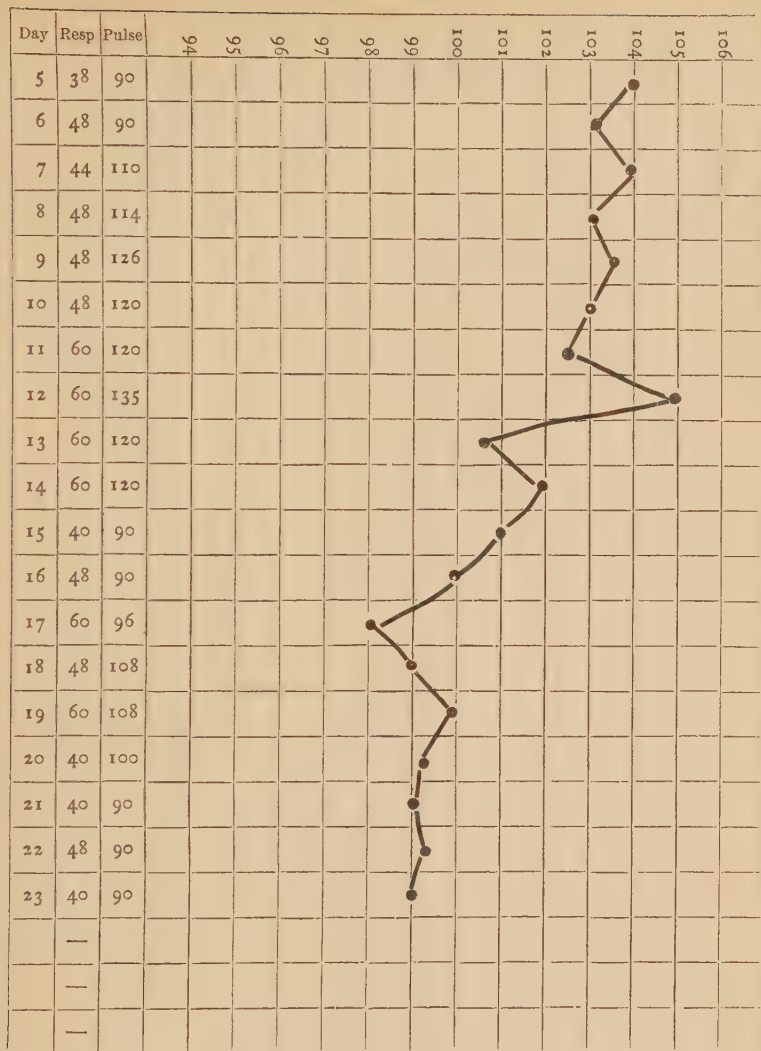


DIAGRAM X.

DEGREES FAH^T.

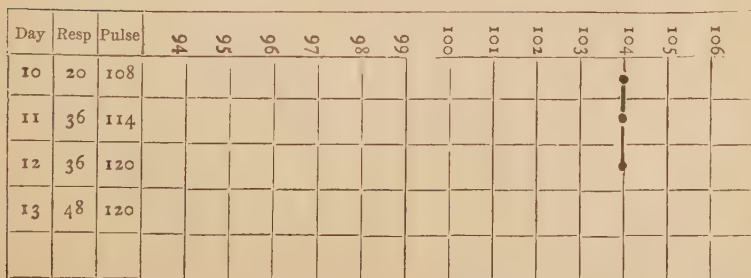


DIAGRAM XI.

DEGREES FAH^T.

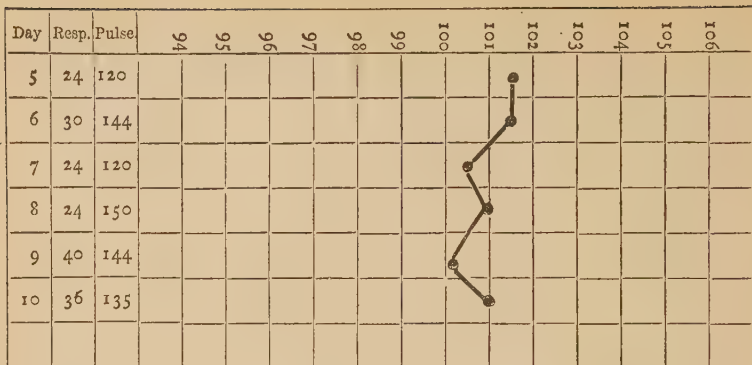


DIAGRAM XII.

DEGREES FAH^T.

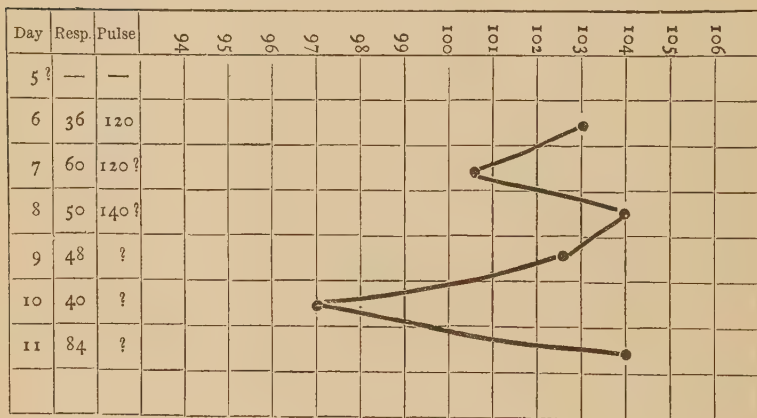


DIAGRAM XIII.

DEGREES FAH^T.

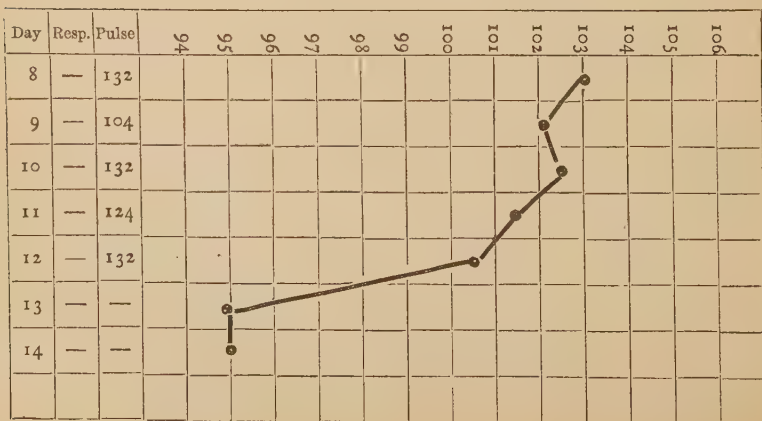


DIAGRAM XIV.

DEGREES FAH^T.

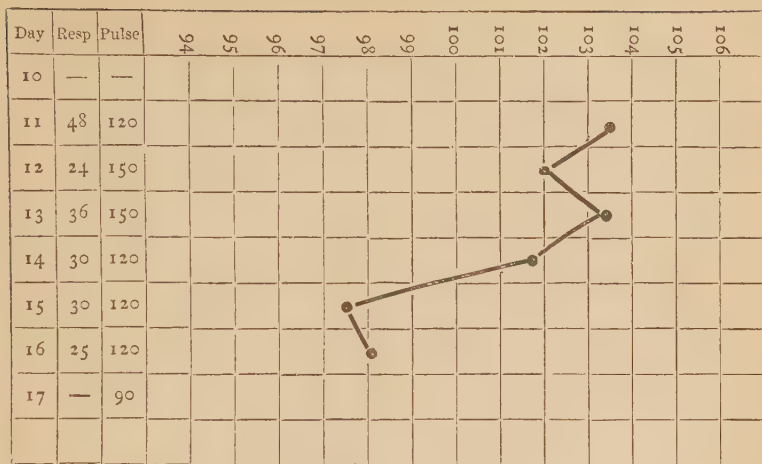


DIAGRAM XV.

DEGREES FAH^T.

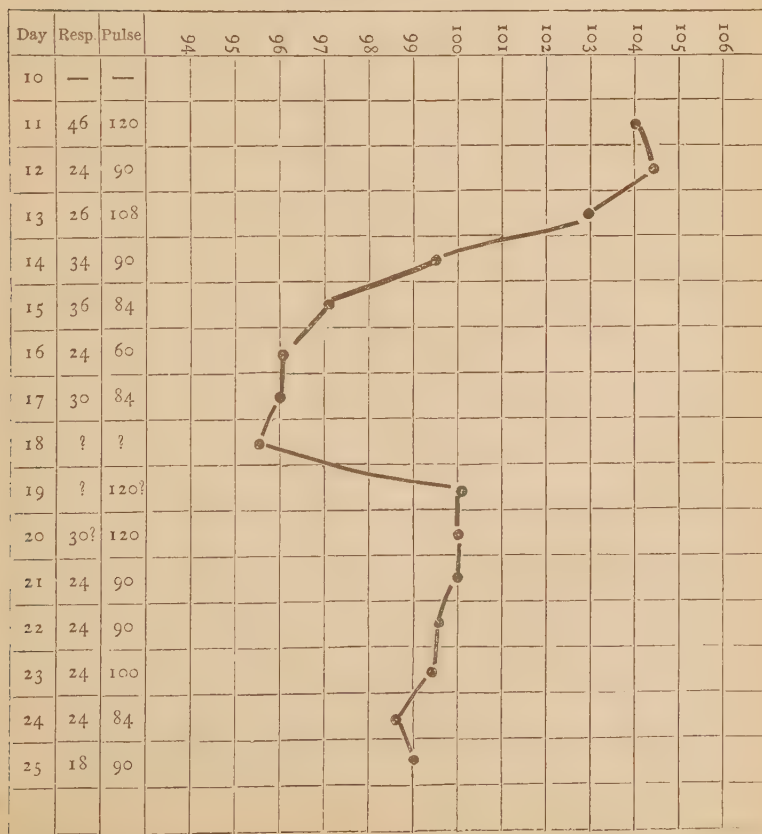






Fig 1.



Fig 2.

MR MAURICE COLLIS'S CONTRIBUTIONS TO OPERATIVE SURGERY.

ART. XVIII.—*Contributions to Operative Surgery. Part I.:*—*Operations about the Face.* By MAURICE HENRY COLLIS, M.B., Univ. Dub. ; F.R.C.S.I., Surgeon to the Meath Hospital and County Dublin Infirmary ; Member of Council of the Surgical Society of Ireland, and of the Pathological Society of Dublin ; Sometime Examiner in Surgery to the Queen's University in Ireland, and Member of Council of the Royal College of Surgeons in Ireland, &c.

(Continued from p. 24).

REMOVAL OF AN ENORMOUS OSSIFIED-ENCHONDROMA FROM
THE FACE.

To the records of operations which have for their object the complete removal of the superior maxillary bone, I should hesitate to make additions. In the pages of this Journal and elsewhere enough has probably been written on the subject for some time to come. I have less hesitation, however, in presenting to the profession a detailed account of an operation which has another interest, inasmuch as it differs from those to which I have alluded in being of a more conservative character. As will be seen, I was able in this instance not only to preserve the palate, nostril, and floor of the orbit intact, and so to lessen to the utmost the deformities and inconveniences which would otherwise have resulted, but I further was able to preserve the periosteum of the bone throughout, and along with the periosteum, the attachments of the muscles. Hence, in addition to the preservation of intelligible speech, the muscular movements of the face, so essential to expression, have been preserved. This application of sub-periosteal resection is but a further extension of those principles which many years ago were put in practice by the writer in operations upon the hard palate—principles which the profession owes first to Mason Warren, of Boston, and in their present enlarged application to Langenbeck, of Berlin. The former, whose lead I had unconsciously followed, merely proposed to himself to make use of the periosteum, combined with its mucous covering, for ordinary plastic purposes ; while to the German surgeon is due the higher praise of perceiving that the firmness, which this method of operating gave to the new palate, was due to some deposits of bone springing from the periosteum. Hence, he quickly applied this method to other parts, with a view of obtaining

a regeneration of bone from the retained periosteum, and with the greatest success. In resections of joints in operations on shafts of bone, and generally in all cases demanding the removal of bone for disease, this sub-periosteal method is now followed by all truly conservative surgeons. It must, however, be remembered that it has the further advantage, above noted, of preserving, along with the periosteum, much of the attachments of the muscles which spring from, and are continuous with this membrane. A moment's reflection will show the wide utility of the proceeding, viewed from this point, and how important its application, whether in operations which interfere with muscles of power, as in the limbs, or with those more delicate, but scarcely less important muscles of expression, which have their attachments to the surface of the facial bones. With these prefatory observations I shall proceed to the details of my case of sub-periosteal resection of the greater part of the superior maxilla.

Early in the present year I was consulted by a gentleman, well known in this city, with reference to a tumour, which produced much deformity of the left side of his face. This gentleman is somewhat under fifty years of age ; is of active habits, and has always enjoyed excellent general health. The history which he gave me of the gradual development of his tumour was to the following effect:—

“ The first indication of the tumour on my face was a slight hard swelling on the gum just by my front teeth [left incisors], which I noticed when I was probably twelve or fourteen years of age. Since that period the swelling continued to grow steadily, but almost imperceptibly, until within the last three or four years, when it developed itself with singular rapidity, and attained such formidable proportions that I became anxious for its removal.

“ Ever since the first appearance of the tumour it was carefully watched by Mr. Adams, and frequently examined (at his request) by almost every eminent surgeon in Dublin, including the late Sir Philip Crampton, Mr. Carmichael, Mr. Cusack, Mr. Colles, Mr. Maclean, the eminent dentist, and others.

“ The general opinion at that period seemed to be against an operation, on the ground that there was nothing malignant in the growth ; that it never would be otherwise than harmless, and because some, including Mr. Cusack, thought ten or twelve years since that it had ceased to grow. However that may be, the fact is

now undeniable that within the last ten or twelve years it has increased more than in all the previous period.

"Some years before Sir Philip Crampton's death, Mr. Adams, Mr. J. Smyly, and I were with him in Merrion Square, and he then made a puncture from the inside of the nostril into the interior of the tumour, and inserting a small tube, got out a trifling quantity of fluid, not more than a drop or two. He first endeavoured to bore through the gum, but failed, apparently from the solidity of the bone. About the same time Mr. Maclean extracted a tooth near the front [left canine], and then made some ineffectual examination with a probe, or some such instrument. I did not feel the extraction of this tooth. I may add I was always deficient by a tooth on this side. The sight of my left eye left me very gradually. It evidently went as the tumour extended, and about fifteen years ago it became completely extinct."

Such is the simple history of this growth, as written down at my request by the gentleman. I have only to add to it a very few particulars, elicited on conversing with him. In the first place the tumour from the very outset was always firm and hard to the touch, showing that, at least, its covering was bony; further, there was no pain either in the tumour itself or resulting from its pressure during the greater part of its progress; even the loss of the eye was so gradual as to be painless, any sensation amounting only to uneasiness. Within the last two years the tumour has grown rapidly forwards, and has distended the soft parts of the cheek. Browache, with shooting pains of a dull nature, have been felt rather constantly during that period. Hearing on that side has also become somewhat dull. The pressure on the left nasal cavity has made it quite impervious. Breathing is impossible through the left nostril, nor can air be forced through it to any appreciable amount. The sense of smell is necessarily in abeyance as regards this side. Even the other nostril participates in the inconvenience, so that when the gentleman is in a warm, dry atmosphere, his comfort is much impaired by reason of a dryness and stuffiness in the nasal passages, and the immediate occurrence of ache in the frontal sinus. With these exceptions he has no physical inconvenience from the tumour, nor until lately did his moral courage fail to support him in bearing, with equanimity, the deformity with which he was afflicted. Contemporaneous, however, with the rapid increase of the growth and its commencing pressure in new and important directions, came

sensibility to observation ; and although he continued to go about the city as freely as ever on matters of business, he assured me, and his assertion was corroborated by the observation of his near friends, that the effort was painful, and that, as far as possible, he had withdrawn from positions of prominence which formerly afforded him pleasure. This is an interesting psychical phenomenon—for it must be remembered, that as far as the public are concerned, the impression produced by the size of the tumour has been at all times much the same. The sensibility to the increase of the tumour was practically limited to the patient himself, to the immediate members of his family, and to those professional friends who had him under observation. And yet, along with a development of the tumour, which, as we shall see, threatened life, there arose in the patient's mind, all unconscious of his danger, first a dislike to be observed, and as that increased, a desire and determination to get rid of the deformity. This acquiescence in the necessity for operative interference, or its opposite condition, a repugnance to the same, may be taken, in reasonable people, as a valuable aid to the surgeon where the propriety of operation is wrapped in more than usual doubt. Without laying too much stress upon it, I would certainly give it in such cases, due consideration. In the present instance the feeling was strong that the time had come when, at all hazards, the tumour must be removed.

I shall now show, by a description of the growth and its relations to surrounding parts, how well founded was this feeling, and how just these apprehensions.

Placing the patient almost in profile, and looking at him from the right side, as in the position shown in Plate I., it was observed that the tumour projected in an even curve from the floor of the orbit to the mouth, so that the prominence of the tumour extended a full inch beyond the outline of the nose. The two nostrils looked directly towards the observer, so great was the distortion of the nose. The left nostril was somewhat dilated. The outlines of the mouth were much altered, owing to the left side of the mouth being depressed, and the left side of the upper lip was much distended over the lower part of the tumour. The lower lip and upper part of the chin were thrown deeply into shadow, and also somewhat out of drawing. Upon reversing the position, as in No. 2, the great prominence of the tumour came fully into view. It occupied the whole region of the cheek, and bore upon its surface evidence of two distinct epochs of growth. If a line be drawn from the

inner angle of the left eye to the angle of the lower jaw on the same side, two distinct types of growth will be noticed, the one occupying the face above, and to the outer side ; the other below and internally. I shall take the former first, as it represents what, for want of a better term, I may call the more chronic condition of the tumour. We observe here a distinct elevation of the floor-line of the orbit ; this is not due merely to an elevation or pushing up of the lower eyelid or other soft parts ; the finger and even the eye could detect that the bony ridge itself was higher than that on the right ; otherwise the bone in this spot was not altered in texture or outline—it was simply pushed upwards. On the outer side the junction of the maxillary and malar bones is prominently seen ; the bones here were expanded, but the body of the malar was not altered in size—it was plain, therefore, that the disease was limited in that direction. Altogether, then, it appeared evident that there was no present active extension of the growth above or outside the line I have imagined to be drawn from the inner angle of the eye to the angle of the jaw. Within this line matters were far different. Reaching high up on the nose, almost to the angle of the eye, and to the central line, a rounded mass of bony hardness, was formed. On the inner side it passed down as far as the lower margin of the ala nasi, where it was joined by a second mass which reached far down into the mouth, and which bore upon its buccal extremity two incisor teeth. Passing outwards these two portions, separated by a fissure on their nasal aspect, became consolidated together, and formed by their union a mass of great size, still rounded in outline, and of firm inelastic nature. The growth pushed the nose out of the mesial line to an extreme degree, and extended outwards and forwards, so as to distend the soft coverings of the cheek to a huge extent. On opening the mouth it was found to have extended backwards to the palate bone, and to have pushed down the palate process of the maxillary even to a greater degree than it had pushed up the floor of the orbit. Along the alveolar ridge it had grown to a greater degree than at any other part, except towards the nose. It was evident that its progress in these directions was fast reaching the utmost limits compatible with any approach to comfort, and that a little more increase would soon threaten existence. This extension downwards, and threatened extension backwards, was likely to lead sooner or later to the filling up of the cavity of the mouth. In Hey's works will be found the drawing of such a case, where the tumour developed in this direction to an enormous amount.

As it was now clear that an operation was unavoidable, I arranged to meet, in consultation, Mr Adams and Sir William Wilde. After careful examination, and a prolonged discussion, a plan of operation was agreed to, which offered the prospect of removing all the active portion of the growth with as little interference as possible with the function of speech. The gentleman's occupation rendered this proviso essential. I was under the impression that this latter object might be attained by simply preserving the muco-periosteal coverings of the palate plate and palate bone; but in this I was overruled, and I finally resolved to attempt to preserve a thin layer of bone along with the periosteum in this locality. Before the details of the operation were conclusively arranged the eye was carefully examined by Mr. Wilson, who reported that there was hopeless disorganization of the vitreous humour, and displacement of the retina, to such an extent as to show that no operation could restore sight. Blindness, in fact, resulted from the remoter effects of pressure, so that the removal of that pressure could not now restore vision. Mr. L'Estrange examined the palate for me, and came to the conclusion that the layer of bone immediately above the periosteum was sound, and that it might safely be retained.

All things being arranged, the operation was performed, on the 7th February, in the theatre of the Meath Hospital, in presence of a very large concourse of surgeons and students. This was due not so much to the severity of the expected operation, as to the personal popularity of the patient, who is extensively known and highly respected as a citizen of Dublin. Chloroform was administered throughout by Professor Macnamara, and during the long and tedious operation, the patient only once became for an instant partially conscious. When I state that the removal of the body of the tumour occupied twenty-seven minutes, and that during nearly half of that time I was engaged at the palate, this result was highly satisfactory.

The patient was laid upon an operating table which admitted of his head being raised to any required degree. I stood in front and to the left side, Mr. Porter close beside me, and Mr. Smyly opposite to him. I have to acknowledge most gratefully the unwearied assistance they gave me during the progress of this most trying operation. My other colleagues, Mr. Wharton and Mr. Stokes, also rendered valuable aid, and Mr. Adams and Sir William Wilde, were close at hand to assist in carrying out the

plan we had agreed upon. As a preliminary step Mr. L'Estrange extracted the two incisors and a bicuspid which alone remained on that side of the jaw. I then plunged a trochar into the tumour above and parallel to the palate, with the two-fold object of ascertaining the density of the bone and of making room for a strong metacarpal saw. The bone was dense enough, but not so dense as to make it hopeless to work the saw. By slow degrees a layer of bone was separated from the floor of the tumour, partly by sawing and partly by the elevator—once it was necessary to use a chisel and mallet to free the saw. I tried two or three saws, but discarded all for the simple straight metacarpal saw. Having effectually separated this layer of bone from the floor of the mouth, I made a vertical incision from the inner angle of the eye to the ala nasi, skirting the attachment of the cartilage, and continued it down through the lip along the curved ridge which separates the outer portion of the lip from the filtrum or central part. I followed this line in preference to a straight cut through the lip, either vertically from the ala nasi or in the mesial line; and for this reason, that the subsequent contraction of the cicatrix in these lines leaves a more ugly pucker than when it follows the line of the natural ridge. By the help of Langenbeck's instruments the periosteum of the tumour was easily detached and turned aside along with the skin and muscles of the cheek. These being held strongly aside by my two chief assistants, I divided the malo-maxillary symphysis by a strong bone forceps. In the same manner the frontal process of the maxillary was divided, the periosteum peeling off with even greater ease, so that I was able to push it and the nose completely to one side. I now, with the bone forceps, divided the attachment of one maxillary bone to the other as near the mesial line as possible. Thus the tumour was detached on three sides. There remained the difficult task of sawing through the connexions of the tumour with the floor of the orbit. The bone was here dense as ivory, and the labour of sawing through it was severe and prolonged. At length, however, after breaking one saw this was completed, and the posterior attachments of the tumour alone remained; powerful traction by the lion-forceps caused these to yield, and a large mass was removed. Above and behind it some of the less dense portions of the tumour still lay; these were scooped out with the gouge, until all was removed which showed the least deviation from soundness. The large piece weighed over four ounces; and as I removed upwards of an ounce of smaller fragments, the weight of all fell little short of

six ounces. This, with the drawing of the section, will give some idea of its size. A couple of small vessels required ligature; and three which bled freely from the surface of the bone, and which could not be ligatured, were stopped by platina wire, heated to a white heat by a galvanic current. The battery for this purpose was kindly brought by Dr. Bennett. I found it both simple and effectual. All active hemorrhage being thus checked, I plugged the cavity with some half dozen small pledgets of lint, tightly rolled and fastened to cords which were allowed to hang out of one corner of the wound. The soft parts in the mouth were first brought together by numerous points of interrupted suture, horse hair being used for the purpose. In a like manner the wound in the lip and cheek were closed. Two points were left for the escape of pus, and for the withdrawal of the plugs and ligatures. One point corresponded to the former situation of the incisor teeth, and the other to the groove beside the ala nasi. With these exceptions the entire track of the wound was brought accurately in contact; no external dressings were applied. The patient bore the operation remarkably well; his pulse was 70 at its close, and very good in quality; he woke up quickly from the chloroform, and had no sickness of stomach. On being removed to bed he was ordered thirty drops of Battley's sedative, and as much ice as he might wish for.

3 p.m.—He has slept well since 12; pulse 72, and full. There is a little sanious oozing only. He is suffering a good deal of pain, but feels inclined to sleep again. He expresses a wish for some beef-tea, which was ordered; also to have tea whenever he wished, and ice. Iced water applied to the face.

8 p.m.—Pulse 92, full and strong—no further sanious oozing, but some discharge of saliva. He has slight nausea, attributed by himself, and rightly, to his having swallowed some blood during the operation. Ice, which relieves this sickness, to be continued. He passed water freely. The upper lip is swelling fast, and there is a good deal of pain about the orbit. To have ice or whey through the night.

10.30 p.m.—Pulse 90—sleeping calmly.

Feb. 8th, 1.30 a.m.—Has slept quietly for periods of ten minutes—the lip a good deal swelled.

He continued to sleep off, and on, until 4 a.m., when his stomach rejected the whey; his feet became cold, and he had a slight rigor for about five minutes. Mr. Sibthorpe, who sat up with him, put a hot jar to his feet, gave him ice, and a draught, with twenty-five

drops of chlorodyne, and two grains of quinine, in camphor mixture; this had the desired effect; he slept quietly until 8 a.m., and had no return of sickness or rigor.

At 9 a.m. his pulse was 100, full and strong; at 10.30 I found his face a good deal swelled, especially about the lower part of the cheek. The eyelids were much ecchymosed, but could still be opened voluntarily. He made no complaint of pain, only of discomfort from the swelling, and from lying on his back. I allowed him to turn on his right side. As the bowels had not been moved, I ordered three grains of calomel, with one of quinine, and one of extract of hyoscyamus; these were taken at once, and operated in the course of the day freely, but not excessively.

At 2 p.m. his pulse was 96, and less full. He had beef-tea through the day.

5 p.m.—Stomach again slightly sick—ordered a gargle of permanganate of potash to clean the mouth. Ice as before.

His pulse went up to 100 in the evening, and remained at that rate through the night. He slept well, waking but seldom, and in the morning of the 9th his pulse was again at 96, but much less full and strong. The bowels were again moved.

At 10.30 I removed, one after another, all the plugs and the two ligatures, pulling them through the aperture left in the month for the purpose. There was no consecutive hemorrhage, and very little fetor; the discharge which accompanied the plugs was moderate in quantity. I syringed the cavity with tepid water, to which I had added spirit of ammonia in the proportion of a drachm to the pint. He had no headache, and was inclined to eat. Ordered—beef-tea, some light claret, and a mixture of chlorate of potash.

3 p.m.—Pulse ran up to 120; wine stopped.

7 p.m.—Pulse down again to 96—no further signs of feverishness; has slept.

Feb. 10.—Very moderate discharge of pus from the cavity through the mouth. The discharge from the nasal cavity, which, it will be remembered, was not opened in the operation, is simply viscid mucus. The swelling is already diminishing. Pulse, 90.

Feb. 12.—Sitting up in the bed for some hours—able to eat a mutton chop cut small—going on most satisfactory. The sutures in the lip removed. This portion had healed with little mark.

Feb. 15.—Daily improving—swelling much abated—appetite and sleep good—pulse, 76. The greater number of the sutures were removed from the external part of the wound. All has healed by

first intention, except a spot at the ala nasi, which is purposely left open for the convenience of syringing out the cavity ; this is done once a day—the discharge is not profuse. He was allowed to sit up for half an hour to-day (9th day). Already some power is returning in the muscles of the cheek; the levator anguli oris is especially under the control of the will.

From this date to the 25th, when he left the hospital, he continued steadily to improve. In fact, he could scarcely be said to have had a serious symptom from the first. The slight rigor in the course of the first twenty-four hours was evidently due to his having swallowed some blood. This, slight as it was, formed the only check in the even progress of the case, while he remained in hospital. Subsequently to his return home he suffered from a small anthrax on the back of the neck ; this, however, yielded to the mild, yet effectual treatment by pressure, which I have now for six years uniformly adopted, and with unvarying success, in every phase and variety of anthrax. I may here state incidentally that since I adopted treatment by pressure, or support, I have never met with an anthrax in which the disease continued to spread after the strapping was once properly applied ; and I believe I have met with them in almost every possible stage and locality. In some rare cases of utterly broken down diabetics it may possibly fail to stop the gangrenous inflammation of the fascia, areolar tissue, and skin ; but I presume that in such cases the knife would be equally ineffectual as a remedy. Even in such cases the combined action of the opium and of pressure would probably check, if it could not entirely control, the destruction of tissue.

Plates III. and IV. show the appearance of this gentleman about the middle of March, six weeks after the operation was performed. Some of the delicacy which necessarily resulted from so serious an operation, is visible in these drawings, which are accurate copies of photographs, taken by Mr. Forster of Westmoreland-street. Since then he has greatly improved. The œdema of the nose and lower part of the cheek has subsided still further, and the cicatrix is less remarkable. The cavity is completely closed, and there is no discharge from it. Power is returning to the muscles of the face.

I shall now proceed to describe the tumour, and its appearance on section. Much of its posterior part was removed piecemeal, but what remained was composed of two kinds of bone. The centre, which may be supposed to correspond to the antrum, is remarkably

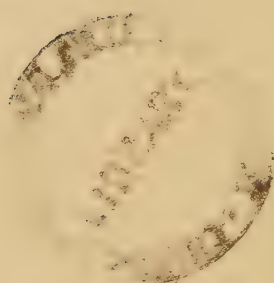


Fig 3



Fig 4

MR MAURICE COLLIS'S CONTRIBUTIONS TO OPERATIVE SURGERY.





hard and close—white, with fine concentric rings, like ivory, which it also resembled not a little in its hardness. All round this, except above, lay a much larger mass of bone, distinctly and coarsely laminated, softer in texture, and enveloped in a very thin and strong layer of hard bone. This external mass was divided into two by a fissure which ran in an oblique curve upwards and outwards into a very small, irregular space, filled with a mass of lining membrane, gathered up and jammed together. These two masses evidently corresponded to the middle and inferior spongy bones; and the fissure and cavity represented that portion of the nostril which normally lies between these two bones. The growth commenced in the antrum, filled it, implicated its walls, extended to the spongy bones, developed itself layer over layer, until the entire nasal cavity was filled. It then continued to grow, producing the immense deformity already described. Originally it had probably been an enchondroma, but as years advanced it ossified, beginning from the centre. The outer layers of the new growth were probably the most recent, as they contained some fragments of imperfect or degenerate cartilage. The whole was enclosed within a real bony layer, derived from the proper tissue of the spongy bones and of the walls of the antrum. I had a section of the tumour made by my friend Dr. John Barker, and I have preserved one half in the Museum of the College of Surgeons. The other half I broke up for the purpose of microscopic examination. It contained a large quantity of animal matter. When this was removed the laminæ of bone were readily separated. They lay one inside the other, either smooth, or here and there folded together, imbricated and crushed, like the unopened petals

of a rosebud, showing evidently the compressing forces which opposed their growth and development. Had these been removed, by rupture of the enclosing bony cyst, and by ulceration of the soft parts, I have no doubt a rapidly growing and fungating tumour would have been the result. I have found this happen in every form of growth, even in the simplest. Under the microscope the bony plates differed little from ordinary bone; they were a little less regular as regards the arrangement of the blood-vessels.

As regards prognosis, this may be said, that the tumour grew slowly, and had a tendency to become inert in its older parts by a process of ossification. Like the Autumn leaf, its vessels and cells became gradually filled or narrowed by increasing deposits of earthy material, and less and less capable of active growth. We may, therefore, fairly hope that as we have removed all the active parts of the growth there will be no reproduction of the disease from the hard, bony floor of the orbit. Already the margin where the saw was used has fined down and rounded away. The layer which was left with so much care along with the periosteum of the palate, vanished in a few days. I had my finger in the cavity, and found that this bony layer was absorbed five days after the operation, leaving only the ordinary periosteum thickened and granulating, but without a trace of bone. The palate, however, is now perfectly firm and efficient for all its uses. The huge cavity has been filled with soft granulations, which at first caused the cheek to bulge forward a little; but with the natural contraction and consolidation of these soft granulations the cheek has gradually fallen in to its proper level, and neither by touch nor in any other way can I detect any sign of disease. I have, therefore, good reason to hope that this tumour, which took thirty-five years to grow, may never be reproduced. The patient may reasonably look forward to a long life, free from the distress and deformity which this enormous growth formerly gave rise to.

I cannot conclude this rather lengthened detail without a word of thanks to the many friends, professional and others, who evinced an unusual interest in the progress of this case. Next to those who personally assisted in the operation, my especial thanks are due to the resident pupils of the hospital, Messrs. Russell and Tredennick, and to my apprentices, Messrs. Scott and Sibthorpe, all of whom watched the case, and noted the particulars for me almost from hour to hour. Nor can I omit to add that the quiet determination and great patience of the gentleman himself tended

very much to his freedom from dangerous symptoms, and to his rapid recovery.

CORRIGENDA.

In Vol. xlii., page 343, first paragraph, for—

“The operation of dividing the gustatory nerve was first performed by Hilton, whose case is given in the seventh volume of the second series of *Guy's Hospital Reports*. From this paper I have taken the liberty of copying the accompanying woodcut, which explains the steps of the operation. Mr. C. H. Moore has also drawn attention to it in the *Medico-Chirurgical Transactions*.”

Read—

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ART. XIX.—*On Cephalotripsy*. By G. H. KIDD, M.D., F.R.C.S.I.,
Assist. Physician to the Coombe Lying-in Hospital, Dublin.

AT one of the meetings of the Dublin Obstetrical Society during the present session I read a paper on cephalotripsy in which I showed that though this operation had been ignored hitherto in the Irish and English schools of midwifery, it was regarded in other schools as one of the greatest usefulness, and by some as an improvement in midwifery only second in importance to the forceps. In that communication I detailed some cases in which I had used the cephalotribe, gave extracts from some of the leading authorities who had written on the subject, and stated in the form of distinct propositions the reasons that induced me to prefer the cephalotribe to crotchets, hooks, and craniotomy forceps in all cases of embryotomy. The paper was published in the *Proceedings of the Obstetrical Society*, at page 224 of the last number of this *Journal*; and as I have now had an opportunity of using the instrument in two other cases of extreme narrowing of the antero-posterior diameter of the pelvis which further proved the correctness of the assertion made, viz., “that the use of the cephalotribe reduces the dangers of embryotomy to a minimum, and allows of its performance in cases where it would not otherwise be possible,” I think it my duty to record the particulars, as I believe a correct estimate of the powers of the instrument will enable us at least to save women from undergoing the risks of the Cesarean section to give birth to children already dead.

On Friday, 25th January, a woman was brought into the Coombe Lying-in Hospital, from a country district, in labour of her first child; my colleague, Dr. Ringland, saw her soon after her arrival. He found the body and limbs of a $7\frac{1}{2}$ months putrid male fetus expelled from the vagina, the head of the child being still within the uterus, and above the brim of the pelvis. On examination, he found the neck had been torn through close to the base of the skull, in the efforts that had been made to extract the head; all the tissues, even the ligaments connecting the vertebral column with the skull, had given way under the force used, and a portion of skin, about an inch in breadth, at the back of the neck was the only connecting medium between the head and the body of the child. Dr. Ringland tried to apply the forceps, but could only get one blade of this instrument introduced, as the curved point of the second caught so in the torn tissues of the neck as to prevent its introduction without the risk of completely severing the connexion between the head and body. He now passed a hook into the mouth, and fixed it on the lower jaw, and tried in this way to extract the head; but the bone gave way, and he did not think it prudent to persevere, deeming the case more suitable for the cephalotribe. I arrived at the hospital at this period, and Dr. Ringland kindly complied with my request to be allowed to use the cephalotribe; so we put the woman under the influence of chloroform, and I proceeded to introduce this instrument, taking care not to complete the detachment of the head.

The promontory of the sacrum projected so much that though I got my hand well into the cavity of the pelvis I could not pass more than two fingers through the brim to guide the point of the blades. The os had closed in some degree below the head, and it was difficult to keep clear of the torn and ragged structures remaining where the neck had been torn away from the base of the skull, and, at the same time, to avoid the lips of the os uteri. By proceeding slowly and cautiously, however, I succeeded in introducing the blades in the transverse diameter of the brim and in seizing the head, which I at once compressed, causing the brain to break down, and pass out through the *foramen magnum*. I now turned the head, so as to bring its compressed and shortened diameter to the narrowest part of the pelvis, and attempted, with a moderate amount of force, to extract, but found the resistance still too great; so I loosened the blades, and applied them again, in a new direction, getting Dr. Ringland to steady the head by placing his hand over

the pubes, while I did so; and proceeding in this way, I made four crushings of the head, and then extracted it with the greatest ease.

I confess I had but little expectation of this woman's recovery. The amount of violence to which she had been subjected, and which had torn the body from the head, must have been very great. She had, moreover, been driven several miles on an uncovered vehicle in very harsh weather, coming to the hospital, and in consequence had a severe attack of capillary bronchitis; but she made a perfect recovery, and left the hospital at the end of three weeks. For some days after delivery there was great swelling of the vagina and labia, and incontinence of urine. The abdomen was tender, and the uterus large, but these symptoms soon disappeared, and recovery was only retarded by the condition of the lungs.

When convalescence was sufficiently established, we made a very careful exploration of the pelvis. We found that its antero-posterior diameter was little more than one inch and three quarters in length. When two fingers were introduced, so that the point of the middle finger touched the promontory of the sacrum, the side of the index finger was in contact, at its first joint, with the symphysis pubis. The transverse diameter was elongated. When examined externally the sacrum was found to be greatly curved and projected forwards. This deformity was, doubtless, due to rickets, of which the skeleton presented other evidence; but we expected rather to have found an exostosis as the cause of the narrowing, for the bones of both upper and lower extremities presented most remarkable examples of these growths. At the right knee there was one on the inner condyle of the femur, and one on the inner side of the head of the tibia, which appeared to form a single mass, and projected inwards, at right angles to the axis of the bones fully three inches; but as the free movements of the limb were not interfered with, there must have been a line of separation between them corresponding to the joint.

Had this woman presented herself at the hospital at the commencement of labour, with a living child, the question of Cesarean section would necessarily have arisen; but with a dead and mutilated child, the body of which was already born, there was no alternative but to extract the head by whatever means we could.

In a most instructive case, recently recorded by Dr. Greenhalgh (*Trans. of the Obst. Soc. of London*, Vol. VII., p. 220), this question arose, and the result of that case might have led us to determine on the adoption of the Cesarean section. It was the

patient's second pregnancy. Labour now set in at the end of the eighth month, the previous delivery having been effected, by the crotchet, with extreme difficulty. It was found that a foot presented; and as the woman had already given birth to a child, it was determined to attempt delivery *per vias naturales*, though the outlet and cavity of the pelvis were below the average dimensions, and there was little, if any, more space than an inch and three-quarters in any part of the antero-posterior diameter of the brim. The feet were drawn down; then the breech and arms, and traction made on the body, and the perforator introduced, but with little effect, in reducing the size of the head. Simpson's cephalotribe was now applied, and the head compressed, and while extractive efforts were made with it, an assistant pulled firmly and steadily on the body. After the most persevering endeavours for about twenty minutes, the body unfortunately separated from the head, and at the same time the cephalotribe slipped. The patient now became alarmingly collapsed, but rallied in about ten minutes, when an attempt to introduce the hand into the uterus failed, and the Cesarean section was performed. The patient died thirty-one hours after the operation.

The close resemblance in many particulars between this case and the one I have detailed is very remarkable, and as I have said the knowledge of it might have led us to perform the Cesarean section at once had the other circumstances of our case permitted; especially as Scanzoni who is a warm advocate of the cephalotribe, says the use of it should not be attempted even with an immature fetus if the shortest diameter of the pelvis be less than O.M. .055 (2.16 English inches). But Pajot's having succeeded by the system of repeated crushings without tractions in safely delivering a woman whose pelvis did not measure more than five centimètres, or 1.9 English inches, and the experience I have now acquired of this system of repeated crushings without traction, both in the case I have detailed, and in experiments on the heads of dead children convince me that cephalotripsy may legitimately be tried in all suitable cases in which the instrument can be passed through the brim of the pelvis.

In the next case, the narrowing of the pelvis was not to the same extent as the antero-posterior diameter was nearly three inches, but the child was full grown, and had not undergone putrefaction, so that the difficulty of delivery was still very great.

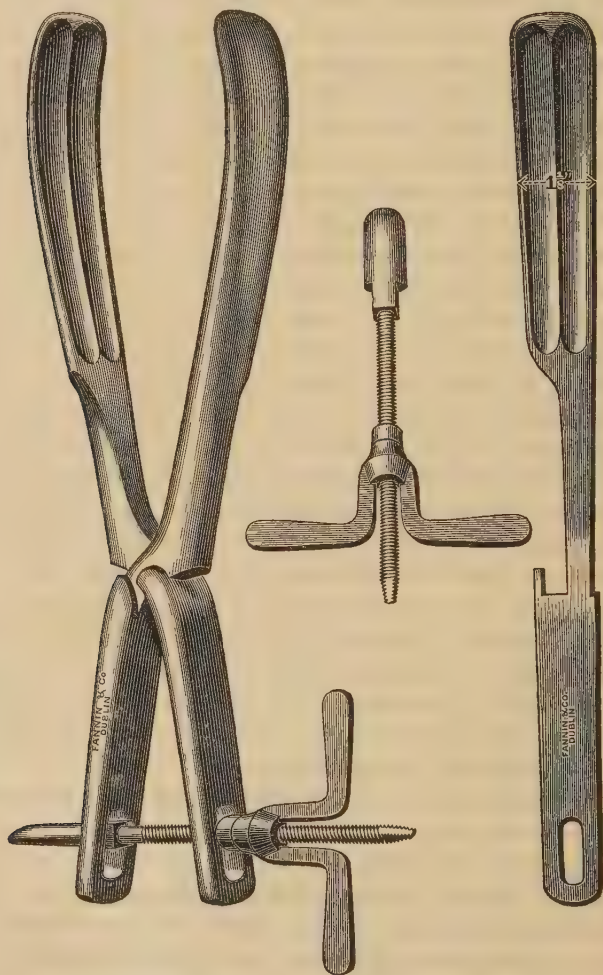
A woman was admitted into the hospital on Friday, 19th April,

in labour of her first child. The membranes had broken on the previous Tuesday, but the os had scarcely begun to dilate when she applied for admission. She had suffered from vomiting and retching since the waters escaped; and when she came into the hospital the vomiting was incessant and very distressing. At one o'clock, p.m., on Saturday, Dr. Ringland and I saw her together, when we found the head completely above the brim, the os nearly fully dilated, but its anterior lip hard, rigid, and caught between the head and the pubes. The promontory of the sacrum was projected very much forwards. There was a large scalp tumour which prevented our ascertaining the exact position of the head, but we believed it to be in the fourth of Nægélè. The uterine contractions were good, but no advance whatever was made under their influence. The uterus was moulded round the child, and there was an offensive thick, olive discharge. The mother's pulse was quiet, and the action of the fetal heart strong and regular. The vomiting and olive discharge made us anxious to effect delivery, and we debated as to whether we should turn or apply the forceps, but were deterred from attempting version by the manner in which the uterus was contracted on the body in consequence of the early escape of the waters; so I applied the forceps, and made as vigorous extractive efforts as we deemed prudent, having first tried to turn the head into the first position; but we could neither advance the head nor turn it; so we withdrew the instrument, and determined to wait some hours, to let the head get moulded to the passage, if possible, by the uterine contractions. At four o'clock we again saw her, but found no change. At eight o'clock we met again, and made another unsuccessful attempt with the forceps; and as the pulse was still quiet, we agreed to wait till eleven. At that hour Dr. Sawyer joined us in consultation. The pulse had now begun to rise, the uterine contractions were becoming unfrequent and irregular; there was some tenderness of the abdomen, the vomiting continued, hiccough had set in, and there was a dry, brown streak on the centre of the tongue. We believed these symptoms demanded immediate delivery—by craniotomy—and my colleagues readily consented to allow me to use the cephalotribe.

I first perforated in the ordinary way, and then applied the cephalotribe, and compressed the head; but, as I found there was still great resistance to its passing through the brim, I loosened the blades and reapplied them three times, crushing the head each time, when a very moderate amount of force was sufficient to

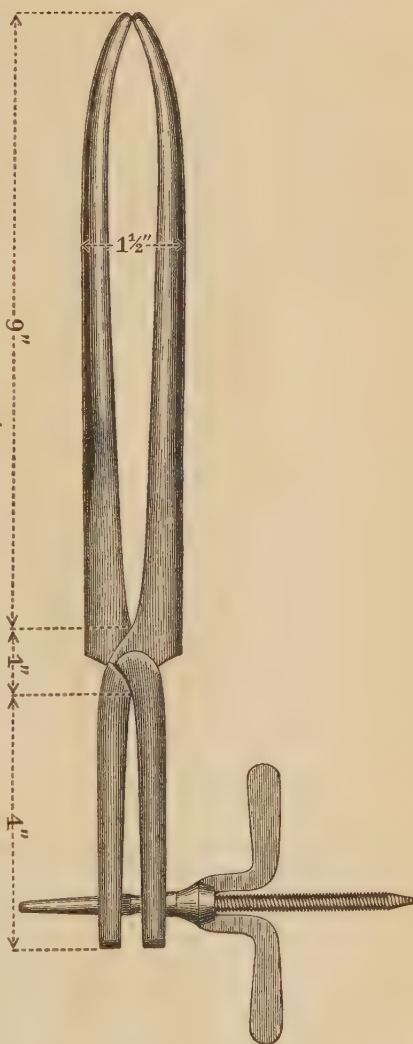
extract it, and the operation was completed with a degree of ease and safety that afforded the greatest satisfaction both to myself and my colleagues. The mother's convalescence was uninterrupted.

In the paper read at the Obstetrical Society, I suggested certain modifications in the form of Sir James Simpson's cephalotribe, and stated that Messrs. Fannin of this city had made the instrument in accordance with my recommendations. In the annexed drawings different views of this are given.



The measurements are contrasted in the table, which I reproduce from my former paper, with those of Sir James Simpson's and some

other instruments. The whole length is the same as Sir James Simpson's, but the handles are half an inch shorter and the blades half an inch longer, that they may more surely include the base of the skull within their grasp. During the operation in the last case I have mentioned, it appeared to Drs. Ringland and Sawyer, and to myself, that it would be better to have the blades made still longer, or rather the shanks of them; for, in the case referred to, the head was so completely above the brim, and the pelvis so deep, that when the blades were applied the lock was quite within the vulva, and there was considerable difficulty in preventing the soft parts from being nipped by the lock. I have therefore advised Messrs. Fannin to add fully an inch to the length of the shanks, so as to throw the lock outside the vulva. The blades have no pelvic curve, and when closed they measure, from the outside of one blade to the outside of the other, only one inch and a half, and each blade is one and an eighth inch broad. The inner surface of each blade is grooved,



as in Scanzoni's and Simpson's, that it may hold firmly the part to which it is applied; and the point of each blade is blunt and round, to facilitate its introduction without injuring the uterus. The lock is made the reverse way to that of Simpson's and all others, and is made so that the groove in the upper blade locks forwards instead of backwards when the instrument has been introduced. In my previous paper I have already dwelt on this

Measurements of Cephalotribes.

	Weight	Entire Length	Blades					Handles		Power
			Length	Breadth	Thickness	Breadth Closed ^a	Pelvic curve ^b	Length of Handles	Length of Joint	
Baudelocque,	lbs. oz. 4 12	In. 20·5	In. 10·5	In. 1·25	In. 0·25	In. 1·75	In. 3·75	In. 9	In. —	Winch and screw
Hodge, .	3 12	19·5	Shank 6·41 × 3·25 9·83	1·41	—	1·5	3	9·5	—	Screw and fly-nut.
Scanzoni, .	—	18·66	10·15	0·98	0·27	2·04	3·81	8·54	—	Screw and lever, with travelling bar.
Braun, .	2 0	16	8	0·91	0·16	2·16	2	6·5	1·5	Screw and joint in handle.
Simpson, .	2 4	14	8·5	1·12	0·25	2	2·37	4·5	1	Screw and fly-nut.
Hicks, .	2 6	15	9·25	1·12	0·25	1·5	3	4·5	1·25	Screw and two movable nuts.
Kidd, .	2 4	14	9	1·12	0·25	1·5	0	4	1	Screw and fly-nut.

point, and stated my opinion that all midwifery instruments should be made in the same way. Since that paper was published I have learned that Dr. Radford, of Manchester, made the same suggestion in his *Essays*, published in 1832, as shown in the following extract:—

“It is the custom in this country to place the parturient female on the right hand side of the bed, and reclining on her left side; so that the respective blades of the long forceps are called the upper and lower blade. Most writers speak of the great difficulty experienced in passing the upper blade, in consequence of the bed or mattress below preventing that depression of the handle of the instrument which is necessary to raise the point so that it can be carried over the head to its ultimate destination. According to the usual construction of the lock of the English forceps, the lower must first be introduced, and however well placed the woman at first has been, during this part of the operation her position is changed; she recedes from the operator further upon the bed, and thus is caused difficulty in passing the second or upper blade.

“Several contrivances have been made to enable the practitioner to

^a Breadth of blades closed is measured across the blades when locked and closed, and includes the thickness of the blades except in Scanzoni's.

^b The pelvic curve is measured by placing the instrument on a horizontal plane and measuring the length of a line falling perpendicularly from the highest point of the blade to that plane. The measurement of Hodge's and Scanzoni's are taken from their books. The others from the instruments themselves.

pass the upper blade with more ease ; such as having a movable hinge in the handle (*Dr. Hamilton's and Dr. Davis' forceps*), or by means of a screw, through which the handle is fastened to the shank (*Dr. Conquest's forceps*). The fears of the woman are usually awakened during the introduction of the first blade, and the anticipation of some dreadful operation leads her to recede from the accoucheur, placing herself in a most unfavourable position, perhaps on the opposite side of the bed ; he cannot, therefore, proceed in his operation until she is again placed in the original position. In order, then, to meet this difficulty, the lock of my long forceps is reversed, so that the upper blade may be passed first, and then there will be no difficulty in introducing the second or under blade."—*Essays on Various Subjects connected with Midwifery*, page 14.

When the head lies low down in the pelvis the form of the lock is not of much consequence, but when it is at or above the brim, the form of lock now recommended will be found to facilitate the introduction of the instrument very much. By reason of it the upper blade may always be introduced first, and carried into its proper position, and allowed to remain there, and the second or under blade may be introduced in front of the first, and in the same manner as the first—viz., first in the axis of the outlet, then in that of the cavity, and finally in that of the brim, as is so well described and figured by Dr. Beatty ; and once introduced it can be carried into apposition with the first blade, and locked without the first being disturbed or displaced. It is one of the "curiosities of literature" that in the figure given by Dr. Churchill of Dr. Radford's forceps—Fig. 76 (*Churchill's Midwifery*, fourth edition)—the lock is represented in exactly the opposite position to that described by Dr. Radford, while in Figs. 74 and 75 of other forceps the locks are represented as described by Dr. Radford, but the circumstance is quite unnoticed in the text.

The screw is the same as in Sir James Simpson's: its head is oblong and the shoulder is squared, so that it can be fixed in its place or removed without the loss of time involved in completely unscrewing the nut ; and when fixed it forms a firm and very convenient cross handle to the instrument.

In conclusion, I have to remark on two objections that have been raised to the instrument in addition to those considered in my previous paper: First—It is said that any case that would permit of the introduction of such a bulky instrument between the head and the pelvis, would be easily delivered by other means. This is founded on a misconception as to the use of the cephalotribe. The

cases suitable for the use of it are those where the head cannot enter the brim, and there is consequently no difficulty in pushing it aside to introduce the instrument, or those in which the head has been caught in the brim or cavity, and where room must first be made for the instrument by the perforator, and by pushing the head back from its position.

Second—It is said a craniotomy forceps will do all that is required of the cephalotribe, but the craniotomy forceps will scarcely diminish the size of the base of the skull; it leaves spiculæ to tear the mother and the hands of the operator, and it affords no means of making extractive force.

Finally, I repeat my assertion that the cephalotribe is to be preferred to all other means of performing embryotomy, the dangers of which it reduces to a minimum, and the performance of which it permits in cases where this would otherwise be impossible; and to this I would add that the true use of the instrument is to lessen the size of the head, for which the crushings must be repeated as often as may be necessary to enable it to pass through the pelvis, with ease, and without forcible traction.

P. S.—It probably accords with the experience of most hospitals that peculiar cases occur in groups. At the Coombe we seem at present to be going through a series of cases presenting very narrow pelves, and so it happens that since the foregoing was written I have had an opportunity of seeing a very complicated and difficult labour case under the management of my colleagues Drs. Sawyer and Ringland, the particulars of which will, I trust, be published, in which, after several ineffectual efforts with the crotchet, delivery was completed by the cephalotribe, in a manner that afforded further proof of the great value of this instrument.

ART. XX.—*A Case of Dilatation of the Abdominal Aorta with Atheromatous and Bony Deposits in the Coats.* By THOMAS DARBY, F.R.C.S.I., L.K. and Q.C.P., &c.; Med. Officer to Rathdown Workhouse and Fever Hospital.

THE accompanying woodcut represents a diseased condition of the abdominal aorta of a gentleman who died in January last.

Mr. S. M., a tall, spare, athletic man, about fifty-five years of age, of very active and strictly temperate habits, consulted me on

29th October, 1865. On my arrival at his house, I found him walking about with a stooped, listless gait; he looked pale, and his



countenance was expressive of anxiety; he told me, in effect, that in the month of June previous, he had received a severe wrench in his back, and had constant though not very severe pain in the left side of his spine, somewhere about the "short rib," ever since; for the last three weeks his stomach had been irritable, he frequently vomited his food, and felt he was growing weaker; he had been under medical treatment, but derived no benefit; he suffered occasionally from hemorrhoids, and had varicose veins in his legs; his bowels were regular, and the renal secretion normal.

Having placed him in the recumbent position on his back, with his head and knees slightly raised, I proceeded to examine him.

his skin was cool, respiration easy, pulse 100, tongue clean and healthy looking; I could not observe any unnatural fulness or tumour in the abdomen, but perceived a very strong pulsation in the epigastrium, where slight pressure induced nausea: on applying the stethoscope to the left of the epigastrium, a loud, rough, bellows murmur was distinctly audible, which I heard in a minor degree as I proceeded downwards to both common iliac arteries where it was lost. I could not hear any murmur in the course of the thoracic aorta; both sounds of the heart were particularly distinct and well defined; when he stood upright the abdominal pulsation greatly diminished, and no murmur could be heard; on examining his spine with the fingers, no tender spot was discovered; but on drawing a warm sponge from the nape downwards, he complained of feeling a hot, uncomfortable sensation as it passed over the ninth and tenth dorsal vertebræ. This was his condition at my first visit.

I visited him at intervals; palliative treatment relieved the irritability of stomach, and he was, after a short time, able to retain a reasonable amount of light nourishment. An enlargement of the left lobe of his liver became manifest, and in the month of May following, it could be easily traced an inch below the margin of the ribs. He grew gradually weaker, and died quietly, apparently from exhaustion, on 22nd January, 1867. A *post mortem* examination, forty-eight hours after death, revealed a cavity^a in the top of the right lung: the thoracic aorta and the heart appeared healthy: the left lobe of the liver, enlarged and soft, contained two or three masses of tubercular deposit on its under surface. It was attached by old adhesions to the great end of the stomach; two lymphatic glands, each somewhat larger than a pigeon's egg, one on either side of the dilatation of the aorta, as shown in the woodcut, were found firmly bound to it by condensed cellular tissue. The aorta, when slit open, presented a rough flocculent appearance on its inner surface: two pits or small dilatations, each containing coagulated blood, occurred immediately below the point where the artery emerged through the diaphragm; copious deposits of atheroma and bony plates were found between the inner and middle coats extending into the iliac arteries, the left of which was completely plugged up by a clot of coagulated blood; no abrasion or other morbid condition was observed in the bodies of the vertebræ.

^a Mr. M. never complained to me of having a cough or expectoration; and his family have assured me that they never knew him to have had a cough until three or four days before his death.

The history, symptoms, and physical signs I have detailed, led me to pronounce the case one of abdominal aneurism: Dr. Stokes, who saw Mr. M. in consultation with me on the 2nd of November (four days after my first visit and fourteen months before his—Mr. M.'s death), taking into account the cachectic condition of the patient, and being unable to discover any tumour, expressed himself doubtful as to the precise nature of the case, but inclined to the opinion that no aneurism existed; and at the time he was probably right; but, that the dilatations containing coagula were incipient aneurism, I believe there can be no doubt. Whether the enlarged glands may not have given support to the weak point in the vessel, and thereby arrested the further development of the aneurism, or the plug found in the left iliac artery was the result of embolism or merely a *post mortem* clot, I am unable to decide; but the case altogether presents so many features of interest, I am induced to make it public.

ART. XXI.—*Report on Cholera, with Remarks.* By Drs. HAYDEN and CRUISE.

MATER MISERICORDIÆ HOSPITAL.

IN the subjoined report we propose to give the details of 197 cases of cholera, admitted into the Mater Misericordiæ Hospital, and treated by us, or under our immediate direction, between the 17th August and the 17th December, 1866.

By previous arrangement, all the cases admitted between twelve o'clock at night and twelve noon of the following day were placed under the care of Dr. Hayden, and those admitted between the hours of twelve noon and twelve at night were placed in charge of Dr. Cruise. Dr. Hayden was supposed to visit the hospital in the morning or midday, and Dr. Cruise late in the afternoon; but all interesting, anomalous, and difficult cases were seen by both of us in consultation. The resident pupils, Messrs. Michael O'Hanlon and George P. Ryan, assisted by Messrs. Coyne and Finnegan, and subsequently Messrs. Conolly and M'Kenna, were in constant attendance, day and night, upon the patients, performing with their own hands the necessary operations, such as administering enemata, registering variations of animal temperature, giving inhalations,

hand-rubbing the limbs, and often lifting the patients into and out of bed. These gentlemen likewise performed a large part of the duty of reporting the cases, under our supervision; and to their intelligence and zeal in carrying out our instructions, and acting in emergencies in our absence, are in a great measure due the favourable issue of several cases, as well as the fulness and accuracy of this report.

To the Sisters on duty in the cholera wards we beg to express our deep sense of obligation, not only for the scrupulous accuracy with which they carried out the details of treatment, but likewise for the valuable assistance which they afforded us in collecting materials for the history of several cases; and to their courage, self-devotion, and unremitting attention to the patients, and the wholesome moral effect wrought by their example in the minds of both patients and attendants, we have much pleasure in bearing our united testimony on this, the first suitable occasion presented to us.

We have classified the cases of cholera under two heads—namely, *choleraic diarrhea*, characterized by purging, vomiting, cramps, and prostration, or at least by two of these symptoms conjoined; and *algid cholera*, marked by two or more of the preceding symptoms, either past or present, *plus* failure of the circulation, depression of temperature, and, in the great majority of cases, lividity of surface; loaded and peculiar tongue; urgent thirst; sunken features; shrivelling of the finger ends; and impairment or loss of voice. These constituted the essential symptoms, and in several instances served to indicate the disease, in the absence of any peculiarity of respiration, suppression of urine, restlessness, or thoracic oppression; all of which, though present at some period in most of the cases, were, nevertheless, so frequently absent that we are forced to regard them as accessory, rather than as essential phenomena.

To each of these symptoms, and others which, being of rare occurrence, must be separately classed as *epiphenomena*, special attention will be directed in the sequel.

In drawing up a report on cholera, or any other epidemic disease, the objects which the physician should propose to himself, as it seems to us are twofold:—Firstly, by a careful classification and analysis of his cases, to educe from them, in the aggregate, definite information in reference to certain questions of a general character, such as the typical features by which the disease may be identified; the exceptional characters it may present; the order in

which the symptoms are usually manifested, and their relative gravity; the mode of communication of the disease; the predisposing and determining causes of the attack; the influence of age, sex, previous health, and habits of the patients, upon the issue of the cases, and the relative value of different medicinal agents and plans of treatment. And, secondly, to offer such opinions upon unsettled questions in relation to the disease under investigation as his *data*, carefully considered and rigidly scrutinized, may seem to him to warrant.

It is obvious that the conclusions arrived at, under these two heads, must possess very different value. The former, being the result of simple calculation, must be admitted, assuming the record and tabulation to be correct, whereas the latter, being matter of opinion, may be questioned, and can carry conviction to the minds of others only in proportion to the weight of evidence on which they are based.

Under these two heads we propose to offer the result of our experience during the late epidemic of cholera in Dublin. We would add that, in view of the possible, and by no means improbable, reappearance of cholera amongst us in the course of the present year, but certainly at no very remote period, it is, in our opinion, the duty of every physician who, with sufficient opportunity for observing and treating that disease, has made it the subject of anxious study, to publish the result of his experience, in the hope that, by a multiplication of carefully compiled statistics and closely observed facts, our acquaintance with the disease in all its bearings and details may become so intimate, that the precise nature of the morbid agent which produces it, and the means by which this agent may be counteracted and neutralized, can no longer elude detection.

It is not true to assert, as is the fashion, that we are ignorant of cholera. Its differential diagnosis has been clearly established; its habitual routes traced and mapped out; the conditions favourable, if not essential to its diffusion are recognized; its prodromata and stages identified and distinguished, and the relative gravity of its symptoms duly estimated; the media of its conduction have been all but universally admitted, and its morbid anatomy made a part of our settled medical literature. In short, our knowledge of the natural history and pathology of cholera may be pronounced as definite and complete as that of any other of the great zymotic class. But, now, let us inquire in what that knowledge is defective?

In relation only to the precise nature of the morbid poison of cholera, and an absolutely successful plan of treatment, can this be said to be the case.

Various attempts have been recently made to isolate the morbid germs of those diseases which admittedly owe their origin to a toxic agent entering the circulation through the medium of the atmosphere; as, for example, scarlatina, measles, typhus fever, and influenza; but in no instance hitherto have these attempts been successful, and at the present time our knowledge of these diseases is, in this respect, quite as incomplete as it is in regard to cholera.

It is not just, therefore, to assert that our knowledge of cholera, in regard to proximate causation, is in a more backward state than it is in regard to the diseases just mentioned.

But, are we to abandon the inquiry into the mysterious agency by which cholera is produced, as one in which success is not attainable? By no means; we should rather hope that through the zealous co-operation of the great number of accomplished and enthusiastic investigators at present engaged in this field of inquiry, prospectively so fruitful in great results, the precise nature and properties of the cholera-poison will be ultimately made out. Till then, and pending the active prosecution of this inquiry, it is our duty to take advantage, to the fullest extent, of the knowledge we actually possess in the prevention and treatment of the disease. It seems to us that already a considerable advance has been made in this direction, chiefly by the method of exclusion, as exemplified in the valuable researches of the Rev. Dr. Haughton, recently laid before the Medical Society of the College of Physicians; and we doubt not that when, by a further application of this method, the alleged causes of cholera shall have been, one by one, examined and set aside, the minds of physicists and chemists shall be so forcibly concentrated upon the few remaining possible causes, that success will become as it were a necessity. Here we would observe that a mere *quality* of the atmosphere, such as an excess or deficiency of ozone, irrespectively of specific contamination, will not account for the origin and spread of cholera. The doctrine of contagion, if well established in relation to cholera, as we believe it has been by our experience of the recent epidemic, will of itself suffice to exclude this hypothesis; for, in the instance of a personal importation of the disease into an uninfected locality, it is impossible to conceive a contemporaneous importation of a special atmosphere, and without the atmosphere its *qualities* could not have been imported.

But, if it be conceded that in the locality whence infection was derived there existed in the atmosphere, by previous importation and reproduction, the specific poison-germs or elements of cholera, of whatever kind, then it will not be difficult to conceive an *adherence* of these to the dress and person of the infecting party, and a communication of them to the infected.

Much confusion has arisen in the literature of cholera from the non-observance by writers of a precise distinction between primary and secondary causes; thus telluric influences are often mentioned as acting directly and immediately on the human body, whereas, manifestly, all telluric emanations operate through the medium of the atmosphere.

The treatment of cholera, though unsatisfactory in its main results, is rendered so chiefly by two causes—namely, the neglect of premonitory symptoms, and the difficulty of bringing about reaction in the stage of collapse, owing to the state of all but complete abeyance of the vital functions which is involved in this stage.

As already stated, we propose to divide cholera into two stages—those, namely, of *choleraic diarrhea*, and of *algid cholera*, or collapse. But in a large percentage of cases, as will appear in the sequel, these stages are preceded by diarrhea, well named “premonitory,” and characterised by watery and painless evacuations, associated with debility, languor, flatulence, thirst, and repugnance to solid food, and feelings of muscular soreness rather than of pain, especially in the calves of the legs. After a period varying from a few hours to as many weeks, the symptoms which constitute the stage of choleraic diarrhea are superadded—namely, the alvine evacuations become more frequent, and assume a thin gruel, or rice-water character. There is vomiting, muscular spasm of the abdomen and extremities, a character of tongue which is *sui generis*, and eminently distinctive of cholera; it is moist, comparatively cold, loaded with yellow creamy fur in the centre, and clean along the edge over a belt of about one-eighth of an inch in width. Thirst is now urgent, and the fluids taken are promptly rejected by the stomach. The pulse is weak, but not quick; the features are somewhat shrunken, and expressive of anxiety, and in many cases the pupils are dilated; the conjunctivæ are usually injected: the surface, in most cases, is dry, chilled, and pallid, but in a few it is suffused and bathed in perspiration. With regard to the order in which these symptoms occur, we have remarked that when preliminary diarrhea has existed, vomiting has been only second in the order of occurrence—that is, in all such

cases it has been preceded by aggravated purging. But in those cases in which the stage of choleraic diarrhea has been at once ushered in, unpreceded by laxity of bowels, or in which the attack has been provoked by excess or indiscretion in diet or drink, vomiting, in all such cases, has taken precedence. In a very small proportion of cases only have cramps been the first symptom exhibited. Collapse now rapidly supervenes; it is at first characterised by the symptoms of the preceding stage, modified only by failure of the circulation. The body exhales a peculiar nauseating odour; it is cold and moist, and to the touch feels like that of a frog; the features are shrunk and livid; the eyeballs sunken; the conjunctivæ injected with purple blood, and smeared with viscid mucus; the pupils are in some cases dilated, and in others contracted to the size of pin-holes; the breath and tongue cold, and the latter moist and coated as already described; the voice is hoarse and whispering, or entirely suppressed; the ends of the fingers and toes are shrivelled, and the nails of a purple colour; the bowels are evacuated involuntarily, the *dejecta* being of a gum or rice-water character, usually containing small white flocculi, and occasionally presenting a faintly pinkish tint. The contents of the stomach are ejected frequently, and with remarkable suddenness and force, often to a considerable distance from the patient's bed; they consist of the fluids taken, intermixed with blood-serum, and often with bile. The patient in this stage is remarkably restless, flinging the limbs about in the most disorderly manner, rolling from side to side, and sometimes actually tumbling out of bed. There is usually complaint of dull aching pain in the loins, associated most commonly with suppression of urine; likewise, of a burning heat in the epigastrium. The expression of suffering is usually subdued, but occasionally the moaning of the patient is loud and distressing to hear. Cramps are, from time to time, suddenly developed in the lower extremities, abdomen, forearms, and hands, causing incurvation of the toes, and rigid straightening of the fingers, and eliciting from the patient loud cries of anguish; they cease usually a few hours before death. The respiration varies in different cases; most frequently it is natural, but in many cases, especially those that exhibit great restlessness, and in which the patients complain of oppression of the chest, the breathing is slow and embarrassed, and in some cases irregular. In a few cases it has been found quickened shortly before death, without a corresponding increase in the rate of the circulation. The pulse ranges, most frequently, from 80 to 90 in

the minute, is small and thready, and soon becomes imperceptible; it is occasionally irregular and intermittent, and this character may be regarded as of exceedingly bad omen. In the early period of collapse the heart's sounds are weak, but distinctly audible; usually, after a short interval, the second sound is suppressed in the aorta, but continues to be audible in the pulmonary artery to a somewhat later period; it next ceases to be heard here, and now the first sound, which had been gradually losing power, is likewise extinguished. Nevertheless, life may continue for an hour, or even longer, in this state.

In a few cases we have noted intermittence of the heart and radial pulse in the advanced period of collapse; and in one of these recovery took place under treatment with large doses of quinine. We have likewise observed in a few cases of collapse that the temperature of the rectum was slightly in excess of that of the axilla; these cases, and the observations made upon them, will be detailed further on in this report. The intellectual faculties usually continue unimpaired to the end, but in a few cases coma has supervened; delirium very rarely occurs.

We hope we may be excused for occupying so much space with a description of the typical and exceptional features of cholera in its several stages, already so well known to the profession. We deem it right, however, to place upon record the aspects and variations of the disease as presented to us during the recent epidemic, for the purpose of comparison in a future visitation. With regard to the suppression of the second sound of the heart in cholera, we are not aware that it has been previously observed.^a

A question of much interest has been debated in connexion with the premonitory diarrhea—namely, whether it should be regarded as being of a specific character, closely allied to cholera, and, in fact, constituting its first stage. We feel obliged, by the evidence before us, to answer this question affirmatively, and to declare our opinion that the premonitory diarrhea, so called, is, when present, the first manifestation of cholera.

^a It afforded us much pleasure to hear Dr. Henry Kennedy stating in the recent debate on cholera, at the College of Physicians, that he had made an observation similar to our own, with regard to the suppression of the second cardiac sound in the collapse of cholera. Doctor Kennedy's observation was strictly independent of ours, as reported in our abstract read before the College in the preceding week, and therefore the more valuable as confirmatory evidence. His observation refers to the second sound *generally*; we should be glad to know whether he has observed the difference which we have mentioned, between the period of suppression of the second sound in the aorta and in the pulmonary artery.

The well-known prevalence of diarrhea, preceding and during an epidemic of cholera, has been often, and we think with good reason, adduced as evidence of an "epidemic constitution" of the atmosphere, influencing the affected locality, and playing an important part in the causation of cholera. Conversely, it may be assumed that the diarrhea which is associated with this "epidemic constitution" is choleraic in its origin and character. The objection that this diarrhea, if early attended to, is amenable to ordinary astringent treatment, is of little weight, and demands a two-fold answer—viz., Firstly. The premonitory diarrhea of cholera is *not* amenable to the treatment successfully employed in ordinary diarrhea; it requires a stimulant, and in some degree, a peculiar treatment. Chalk mixture with opium, catechu, &c., which promptly arrests simple diarrhea, has not, usually, an equal measure of success in that which precedes cholera, whilst sulphuric acid is all but invariably effectual in checking it. 2ndly. The successful treatment by astringents, of diarrhea, regarded as an early symptom of cholera, only shows that the treatment of symptoms, in the absence of a better indication, should not be disregarded. A symptom is but the reflection of a morbid cause in active operation in a particular part or element of the body, and to arrest the process by which the symptom is produced, is, in effect, to suspend the activity of the cause, if not to neutralize it. Diarrhea is one of the earliest symptoms of cholera, and not the less choleraic because easily curable, and, as we believe, incommunicable in this stage. In all the alleged instances of importation of cholera by persons suffering at the time from diarrhea only, the infecting party has invariably passed into the more advanced stages of the disease before the infected have exhibited any of its recognized symptoms.

In a large percentage of cases, as will appear from one of the subjoined tables, diarrhea has preceded, often by several days, and in a few cases even by weeks, the manifestation of cholera in its typical form; and during an epidemic of cholera it is well known that diarrhea, if neglected, most frequently issues in an attack of that disease.

Dr. Sedgwick Sanders, in a report upon the recent epidemic of cholera presented to the Diseases Prevention Committee of the City of London Union,^a states:—"That the experience of the medical officers employed in the Union has confirmed the conviction

^a Medical Press and Circular, February 6, 1867.

that the early treatment of diarrhea cannot be too strongly insisted upon, as there is much reason to believe that this so-called *disease* is often an early *symptom* only, and must be looked upon as an essential premonition of the choleraic incidence, so that many cases treated successfully as diarrhea ought, nosologically, to be classed under the head of cholera cured in its early or premonitory stage. This admits of no more direct *proof* than any other negative proposition; but analogy and experience justify the assumption—hence the advantage of searching out such cases by daily house-to-house visitation, and in this manner enabling the medical practitioner (by dealing with the disease at its inception) to arrest its degeneration into the more severe and less tractable phases.”

M. Borlée,^a writing of the recent cholera epidemic at Liege, states that:—“During an epidemic we all experience, in greater or less degree, the influence of the choleraic poison.” If by this statement it is meant to be conveyed that in an infected locality a large proportion of the inhabitants, reputedly in good health, experience malaise, characterized by nausea, partial loss of appetite, and flatulence, and an indescribable sensation in the abdomen of an unpleasant character, with slight muscular pains, we quite concur with M. Borlée, in the opinion that the coincidence indicates the presence of a noxious atmospheric influence operating upon the entire locality, and conveniently designated as an “epidemic constitution.”

The idea conveyed by the words “epidemic constitution” involves one of the deepest mysteries in medicine. It implies a condition of body favourable to the operation of a subtle and impalpable agent diffused amongst the inhabitants of a limited district at particular times. What is the nature of this agent, and the medium of its conveyance? and what the precise condition of body that favours its attack? In reference to the two latter questions, opinion is now all but unanimous in regarding atmospheric air and water as the media through which the poison of cholera is introduced into the body, and a certain undefined state of depressed vitality as the condition of its effective operation. But although our knowledge is practically advanced by these *data*, and we are thereby enabled to dispute the approach, and even to preclude the attack of the choleraic agent, still we require to be informed as to the distinctive peculiarities of the choleraic atmosphere, of the water contaminated with the poison of cholera, and as to the precise

^a Bulletin de L'Académie Royale de Médecine de Belgique, Année, 1866.

condition of body that constitutes a receptivity of that poison. Mr. Paget declares:^a—"That the existence of certain materials in the blood may determine the formation of structures in which they may be incorporated." It would seem, by a parity of reasoning, not unwarrantable to assume the existence of certain conditions of that fluid which may invite or determine the invasion of a morbid agent suspended in the atmosphere, or in the water made use of by a community.

Of the existence of a definite condition of the blood, as necessary to the reception and development of morbid poisons, examples are afforded in the immunity from syphilis, small-pox, scarlatina, and other diseases of this class, enjoyed by individuals at particular times. Thus, of a number of persons inoculated at the same time, with the vaccine virus obtained from one source, only a certain percentage will develop the disease, although at another time the persons who thus resist may be successfully vaccinated. Again, scarlatina or measles may invade a family of several children, of whom one or more may escape the disease, though exposed equally with those who contract it; at a subsequent period these persons, though exposed perhaps in a minor degree, may receive the poison they had previously resisted, and develop the disease even in an aggravated form. In all such cases, of which examples are numerous, the legitimate and necessary conclusion is, that in the first instance a state of receptivity, or blood-affinity for the poison did not exist; and that such inaptitude was of temporary duration, and coeval with the absence of those vital conditions that constitute a state of receptivity.

We attach no importance to the allegations made in reference to coloured mists and vapours said to have been witnessed in localities visited by cholera, because they rest upon unsatisfactory evidence; at the same time, we cannot admit the impossibility of such meteoric phenomena, holding as we do, that the atmosphere of a cholera-infected locality becomes, after a short time, charged with the poison of cholera extricated from the bodies of those stricken with that disease. The nature of this poison is as yet undetermined; but if it shall be found to be *organic*, as seems to be indicated by the evidence we possess, then the presence in the atmosphere of myriads of minute organisms would afford, on physical grounds, a satisfactory explanation of the optical phenomenon of coloured mists.

^a Lectures on Surgical Pathology, Vol. i., page 27.

M. Chauveau, of Lyons, has recently proved experimentally that horses may be vaccinated by causing them to inhale the dried and pulverized matter of the vaccine vesicle; in these instances the resultant vesicles were formed, not on the bronchial, but on the cutaneous surface, thereby showing the predilection of the disease for its ordinary habitat, irrespectively of the mode of its communication. These experiments, moreover, prove conclusively the communicability of zymotic disease, in a palpable form, through the medium of the atmosphere.

In the capillaries of the atrophied intestinal villi of patients who had died of cholera, Dr. Beale^b has discovered bacteria, and the sporules of fungi. We have, ourselves, found in the deposit upon the tongues of cholera patients vibriones in active motion, and chains of sporules. No doubt, the infusoria and sporules of fungi so found may have been the product of decomposition; but it is worthy of notice that in the deposit taken from the tongues of patients suffering from diseases, other than cholera, we have invariably failed to detect such products. The evidence before us, then, would seem to warrant the admission that cholera *may* have for its immediate cause minute living organisms, introduced as such into the body, or developed therein by a process of zymosis from a specific morbid ferment introduced by the lungs or alimentary canal.

There are two opinions held in regard to the origin and propagation of cholera; one, that it is of telluric origin, the atmosphere and water serving as media of dispersion—of unknown quality or nature—having a special and peculiar affinity for the human body; and favoured, if not absolutely determined in its invasion of individuals and communities, by a lowered hygienic condition the result of errors or imperfections in the supply of air, food, water, or one or more of these.

The other, that it originates only in, and is peculiar to, the human body; that it is of the nature of a specific animal poison, organic or inorganic; that it is communicated by the infected to the uninfected, either directly, through the excretions or emanations of the former brought into contact with, and introduced into the bodies of the latter by immediate personal or fomic intercourse, constituting *contagion*; or indirectly through the air and water, constituting *infection*; but in either case requiring a receptivity on the part of the infected as a necessary condition of attack.

^a Medical Times and Gazette, February 23, 1867.

^b Medical Times and Gazette, January 5, 1867.

Various modifications of these views are held, which it is unnecessary here to specify; indeed, many of the opinions put forward in relation to the natural history and pathology of cholera rest upon mere assertion. For ourselves, we do not pretend to say how, or from what precise source, cholera has taken its origin; this portion of its history, like that of other specific and contagious diseases, is absolutely unknown. That the history of cholera dates further back than the year 1817, when it is said to have first shown itself in the Delta of the Ganges, has been satisfactorily proved by Dr. Craigie,^a who identified in the cholera of our own time a disease described under that name by Aretæus, who flourished before the reign of the Emperor Titus.

Dr. Graves,^b quoting from Le Begue de Presle, says:—"In 1762 it (cholera) prevailed very extensively in Upper Hindostan, and destroyed thirty thousand negroes, and eight hundred Europeans." The same learned writer gives several extracts from other authors and travellers in India, which show conclusively that as early as the last quarter of the eighteenth century cholera was familiarly known in that country.

Of the precise nature of the poison of cholera scarcely more is known than of the date of origin of the disease. We have already given some evidence to show that the organic theory has most facts, rather, however, of an indicative than of a positive character, to support it. It is to be remarked, also, that this theory best accords with the indubitable adherence of the infecting principle of cholera to the dress and furniture of the infected; its rapid multiplication; gradual decline; and connexion with heat and moisture.

That it is not of a gaseous nature in a state of combination with the surrounding atmosphere, and independent of reinforcement from local sources, seems indicated by its indifference to strong winds, and by its property of self-multiplication, which is not characteristic of gases, or other inorganic bodies.

Thermometric variations seem only to supply conditions that favour or retard the progress of the epidemic, but never to give origin to the disease in the absence of its specific germs.

We believe that between separate localities and communities the vehicle of conduction for cholera is man himself, infected by the disease, and manifesting at the time its unequivocal symptoms; or his dress, bedding, or other articles in close relationship with his

^a Edinburgh Med. Journal, Vol xxxix., page 332. Et sequent.

^b Dublin Journal of Medicine, January, 1840, Page 359.

person whilst the subject of cholera. From this it follows that the rate of transit of the poison of cholera must be equal to that of man himself, and must vary with the rapidity of human intercourse.

We regard it as proven, and will give evidence to this effect in the sequel, that the atmosphere of a cholera-stricken locality may serve as the medium of contamination for short distances, as between the different apartments of the same house, or the adjacent streets of the same town. It would seem, however, that the atmosphere must have attained what may be called the saturation-point of choleraic impurity before it can serve in this manner. Cholera is, therefore, in this limited sense, *infectious*, and although direct importation by means of persons or *fomites* is necessary in the first instance, after the lapse of a certain period of time an "epidemic constitution" of the atmosphere is created in the locality by the multiplication of cholera germs; and now the disease may spread within limited areas by the atmosphere alone, and irrespectively of personal communication. Subsequently it would seem that the condition of depressed vitality, whether due to personal or local causes, will alone suffice to determine an attack amongst the residents of a district so circumstanced.

The sudden invasion by cholera of persons previously in good health, immediately, or within a few hours after taking food or drink to excess, or of an unwholesome character, but free from the suspicion of containing cholera-germs, may be likewise adduced as evidence of an epidemic constitution. Of such a mode of seizure several examples will be given in the subsequent part of this report. In these instances the connexion as of cause and effect was too striking, and the coincidence mentioned of too frequent occurrence, to admit of the supposition that previous contamination by personal contact or otherwise had taken place. Moreover, in all these cases, the premonitory diarrhea which usually marks the accession of cholera contracted by exposure to contagion, was absent, whilst the causes to which the attack was attributed are admittedly incapable of producing it in ordinary times.

The explanation of these cases seems to be, that the excess or indiscretion committed, not only created a receptivity by diminishing vital resistance, but actually invited and promoted invasion by ushering in two of the most prominent symptoms of the disease, namely, vomiting and purging.

The comparative want of success which has hitherto attended

the treatment of cholera most certainly applies only to the stage of collapse; the preliminary diarrhea is arrested, and cholera, as it were, aborted, by a few doses of dilute sulphuric acid conjoined with a regulated diet. Choleraic diarrhea, as will be shown, is likewise curable by the same treatment, with the addition of frictions, warmth, sinapisms, and a few other adjuvants. To this statement we have met with only four exceptions, which we beg to introduce here for the purpose of comparison, and because they serve to prove the general rule we have ventured to enunciate.

CASE I.—James Dowse, aged forty, of temperate habits, admitted into hospital October 20, at 9.30 a.m. The day previous to his admittance he had attended his wife's funeral, and subsequently drank to excess; on the evening of that day he was seized with vomiting and cramps. On the morning of the 20th, when admitted, he was suffering from vomiting, purging, and cramps in the legs; the surface was remarkably pallid, indeed blanched, justifying the designation of "white cholera;" the tongue was moist and coated, but not clean upon the edge as in all the other cases that came under our notice. Ten grains of calomel were given immediately; and at 11 a.m., as the intestines seemed distended with fluid, a draught was given containing *ol. Ricin. ʒiv.*, *Tinct. Rhei. ʒii.*, *aquæ Menth. Pip. ʒi.*—After this had acted calomel was again given in doses of *gr. ii.*, every hour. Warm jars were applied to the feet and legs, and mustard cataplasms to the abdomen. The patient died in collapse at two o'clock on the morning of the 21st, twenty-eight and a half hours after seizure, and sixteen and a half hours after admission into hospital. Whilst under treatment, he took *gr. xxxii* of calomel.

In this case, at the period of invasion, there existed the unfavourable condition induced by depression of spirits and a debauch; and the treatment did not include sulphuric acid and opium.

CASE II.—A woman named Johanna Burke, aged about sixty was admitted labouring under "choleraic diarrhea," treated with chalk mixture and aromatics she got better of the diarrhea, but passed into a low febrile condition, in which she died.

CASE III.—Francis Clarke, aged thirty-eight, of very intemperate habits, was admitted to the hospital, October 18th, suffering from severe choleraic diarrhea, with vomiting and cramps. He

had been ill twelve hours previous to admission, but was quite warm, and showed no symptom of collapse. Despite of treatment by calomel, sulphuric acid, stimulants, external heat, &c., he ran on into collapse, and died, October 21st, having had severe convulsions before death.

CASE IV.—A shopkeeper, resident in Dublin, called upon his medical attendant late in the evening of the 9th October, to request that he would visit one of his children who was slightly ill; this child was found to be labouring under cholera, and despite the skilful treatment applied, rapidly passed into collapse, and died. Before the medical gentleman left the house, another of the children was reported ill, and in defiance of the treatment promptly and assiduously employed, became collapsed and died.

A third member of this afflicted family, a boy aged about nine, complained of being slightly ill when the medical attendant was about leaving; he was put under appropriate treatment, but notwithstanding, upon a subsequent visit made within a few hours, he, too, was found in the stage of collapse, and died shortly afterwards. Thus, in this single house, three members of one family were seized with cholera, and carried off in the course of one night, in defiance of the the most skilful and assiduous treatment by a gentleman who has had large experience of the disease in former visitations. We have been informed by that gentleman that the nauseating odour which he experienced in that house, whilst in attendance upon these children, was of so overpowering a character that he felt great difficulty in restraining himself from vomiting, and succeeded only by taking some brandy on the instant. On the following morning, by the advice of the medical gentleman in attendance, the mother and the three remaining children were removed to an avenue in the suburbs; within a few hours of their removal, one of these children, a girl, aged about fourteen, was attacked with purging and vomiting, and at five o'clock on the evening of that day she was visited by Dr. Hayden, in consultation with the family physician. The patient was found swathed in flannel, and surrounded by hot jars. The surface was warm and perspiring; pulse quick and firm; there was purging, and occasional sickness of stomach; and cramps, not of a very urgent character, occurred at intervals. The patient was at once put upon the sulphuric acid and opium treatment; but, notwithstanding, collapse supervened within a few hours, and the patient died in the course of

that night. In this case, therefore, we have an example of choleraic diarrhea of a typical character, resisting the treatment all but uniformly successful; but the history of this child's family, above detailed, justifies the conclusion that her hygienic condition was so depressed, and that she had received so large a dose of the poison of cholera, as to set all treatment at defiance.

We here beg to introduce the following tables, in which we think will be found the most important particulars respecting the disease as seen by us:—

TABLE 1,

Showing the number of cholera cases admitted into the Mater Misericordiæ Hospital each week during the epidemic of 1866, viz., from the 17th August to the 17th December, inclusive. The average duration of illness, period in hospital, and result of these cases:—

Week ending	No. of cases	Average duration of illness, in hours		Average period in hospital, in hours		Result		Per centage mortality
						Died	Recovered	
August 21,	1	hours	minutes	hours	minutes			
August 21,	1	600	0	432	0	—	1	—
„ 28,	4	47	0	34	45	2	2	50·0
September 4,	13	109	13	75	41	3	10	23·0
„ 11,	18	66	9	42	41	10	8	55·5
„ 18,	13	139	34	94	28	6	7	46·15
„ 25,	30	89	14	55	14	19	11	63·3
October 2,	17	92	39	72	50	6	11	35·3
„ 9,	22	82	19	54	29	14	8	63·63
„ 16,	16	62	58	43	42	11	5	68·75
„ 23,	21	53	42	96	8	10	11	47·62
„ 30,	11	120	12	69	43	5	6	45·45
November 6,	9	127	6	96	33	3	6	33·33
„ 13,	11	75	32	57	18	9	2	81·81
„ 20,	7	28	12	16	51	6	1	85·5
„ 27,	2	91	7	76	7	1	1	50·0
December 4,	1	84	0	52	0	—	1	—
„ 11,	—	—	—	—	—	—	—	—
„ 18,	1	26	0	19	0	1	—	100·0
Weeks, 18,	197	105	16	77	11	106	91	53·8

As regards this (Mater Misericordiæ) hospital the epidemic lasted 18 weeks, during which period a total of 197 cases were admitted. The average duration of illness of these cases, recoveries and deaths both included, was 105 hours and 16 minutes, and the average period in hospital, 77 hours and 11 minutes. Total mortality, 106, or 53·8 per cent. of those attacked, and the recoveries, 91.

It will be seen that whilst the largest number of admissions took place in the last week of September and the first half of October, the greatest per cent. mortality occurred during the first half of October and the middle (13th to 20th) of November. The first two weeks of October were, therefore, the most signalized, both in regard to the number of cases admitted, and the death-rate.

TABLE 2,

Showing ages of patients within decennial periods, previous state of health and habits, average duration of illness, period in hospital, and result:—

Ages of Patients	No. of cases	Previous health and habits			Average duration of illness in hours	Average period in hospital, in hours	Result		Per cent mortality	Per cent. in good health	Per cent. in bad health
		Good health	Bad health	In-temperate			Died	Re-covered			
Under					H. M.	H. M.					
10 years	37	32	5	—	93 40	69 3	20	17	54·0	86·48	13·51
10 to 20	27	18	9	—	159 8	113 24	9	18	33·3	66·66	33·33
20 to 30	47	36	10	6	100 34	77 11	19	28	40·4	76·6	21·27
30 to 40	35	29	6	10	64 23	36 21	22	13	62·9	82·86	17·1
40 to 50	26	21	5	2	85 7	50 36	19	7	73·07	80·8	19·2
50 to 60	14	12	2	—	44 46	25 3	12	2	85·7	85·5	14·3
60 to 70	7	4	3	—	178 34	92 8	3	4	42·85	57·14	42·86
70 to 80	4	2	2	—	45 37	30 0	2	2	50·0	50·0	50·0
	197	154	42	18	96 28	61 43	106	91	53·8	78·17	21·3

TABLE 3 A.

Showing number of persons, within decennial periods of age, admitted in stage of *choleraic diarrhea*, average period in hospital, treatment, and result:—

Age	No of Cases	Average period in hospital	Treatment ^a	Died	Recovered	Mortality
Under 10 years	6	H. M. 40 0	Dilute sulphuric acid and tincture of opium, creasote water <i>ad libitum</i> , warm applications and sinapisms, hand friction, - - -	—	6	—
10 to 20	7	97 43	6 Dilute sulphuric acid and opium, &c., as above mentioned, 1 chalk mixture, - - -	—	7	—
20 to 30	19	84 51	12 do. do. do. In one case this was preceded by a draught of castor oil, and in another it was followed by calomel given as stated below. 1 took tinct. opii. m.x. mixed in an ounce of brandy. Calomel was then given, followed by bismuth and chlorodyne draughts. 1 an oil draught with tinct. opii., and creasoted water for drink. In 4 cases purgatives were given, and one was treated expectantly, - - - - -	—	19	—
30 to 40	10	55 54	In one case acid and opium mixture, with creasote, and external heat constituted the treatment. In 4, acid and opium; 1, calomel and creasote; 2, chalk mixture; 1, expectant, - - - - -	—	10	—
40 to 50	4	31 37	In 1, tinct. opii. with nit. spirit of ether and camphor mixture was given, preceded by draught of castor oil. In 1, oil draught, followed by calomel in the usual doses. 1, chalk mixture; 1, acid astringent do. - - -	1	3	—
50 to 60	2	59 30	Acid astringent mixture, - - - - -	—	2	—
60 to 70	4	127 0	1, acid astringent mixture; 1, calomel, followed by bismuth, chloric ether, and tinct. opii. in camphor mixture; 2, chalk mixture, 1, chalk mixture; 1, spirit ammonia arom. with tinct. opii., - - - - -	1	3	—
70 to 80	2	44 0		—	2	—
	54	67 34		2	52	3·7

^a For details of treatment, see Table 4, A and B.

N.B.—A third instance of death, the patient having been admitted in the stage of choleraic diarrhea, occurred in hospital (viz. Case 3, page 358), and was, by inadvertence, not taken account of till after the calculations for Table 3 A had been made. This case, therefore, does not appear in that table; but allowance can be made for it in estimating the per cent. mortality amongst patients admitted in the stage of choleraic diarrhea.

TABLE 5,

Showing the number of cases in which premonitory diarrhea existed; its average duration; the order of occurrence of the three principal symptoms, viz., purging, vomiting, and cramps; number of cases in which there were assignable causes (exclusive of neglected premonitory diarrhea and contagion); number of cases in which the attack was fairly traceable to contagion:—

Total number of cases	Number of cases in which there existed premonitory diarrhea	Average duration of premonitory diarrhea (in hours)	Order of occurrence of the principal symptoms, viz., purging, vomiting, and cramps	Number of cases in which the attack was due to any assignable cause, exclusive of neglected diarrhea or contagion	Number of cases in which the attack was fairly traceable to contagion or infection
197	65	96	CASES		
			P. V. C., 39	Intemperance, - 18	
			V. P., - 37	(9·1 per cent.)	
			P. V., - 30	Foul water, - 3	
			Not stated 30	Eating cockles, - 1	
			V. P. C., 26	Eating cold cabbage, 1	
			P., - 13	Eating fish, - 1	
			P. C., - 5	Eating pork, - 1	43
			C. P. V., 4	Eating badly cooked	
			C. V. P., 3	cabbage, - 1	
			C., - 3	Drinking sour porter, 1	
			V. C. P., 2	Dentition, - 2	
			P. C. V., 2		
			V. C., - 2		
			C. P., - 1		
197	65 (33 $\frac{1}{2}$ cent.)	96	Total, 197	Total, - - 29 (14·7 $\frac{1}{2}$ cent.)	43 (21·8 $\frac{1}{2}$ cent.)

It is unnecessary to make any comments on this table, which speaks for itself. It is well, however, to direct special attention to the large proportion of cases (33 per cent.) in which *neglected* diarrhea was the assigned cause of attack; and when the remarkable prevalence of diarrhea during an epidemic visitation of cholera is borne in mind, the above figures become very significant. The importance of promptly attending to diarrhea during such periods is still further enhanced by the striking illustration afforded by Table 3 A, of the *curability* of the disease, even in the more advanced stage of choleraic diarrhea, as indeed by all the returns recently made to the College of Physicians from the hospitals of Dublin in which cholera had been treated during the late epidemic.

The large percentage of cases in which the attack was attributed to the excessive use of alcoholic stimulants is likewise noteworthy. Scarcely any recoveries took place amongst patients habitually intemperate. The large proportion of cases (21·8 per cent.) in which the attack was presumably attributable to contagion is worthy of remark. Cases of cholera had occurred in the houses, or the imme-

diate families, of all the patients (43) included in this category, and in each of them, likewise, direct personal exposure was clearly established. In several instances three or four persons stricken with cholera were admitted from the same house.

TABLE 6,

Showing the number of cases in which secondary fever occurred—the sex and ages of the patients—the period of access—the duration, and the result:—

No. of cases	Sex		Age, in years	Date of Access	Duration, in hours	Result	
	Male	Female				Died	Recovd.
1	1	—	24	5th day of illness	24	1	—
2	—	1	48	2nd " "	120	—	1
3	1	—	19	6th " "	216	—	1
4	1	—	46	3rd " "	51	1	—
5	1	—	26	5th " "	144	1	—
6	—	1	16	8th " "	120	—	1
7	1	—	6½	4th " "	72	1	—
8	1	—	22	4th " "	109	—	1
9	1	—	42	10th " "	96	1	—
10	—	1	20	4th " "	72	1	—
11	1	—	24	10th " "	72	—	1
12	—	1	16	3rd " "	528	—	1
13	—	1	16	9th " "	48	1	—
14	—	1	61	3rd " "	168	1	—
15	1	—	7	4th " "	96	—	1
16	—	1	17	3rd " "	72	—	1
17	—	1	46	9th " "	96	—	1
18	1	—	35	3rd " "	48	—	1
19	1	—	8	9th " "	96	—	1
20	1	—	8	4th " "	172	—	1
21	1	—	19	5th " "	144	1	—
22	—	1	16	3rd " "	340	—	1
23	1	—	1½	8th " "	96	—	1
23	14	9	—	From 2nd to 10th day,	Av. duration, 139 hours.	9 cent. 39·13	14

TABLE 7,

Showing the number of cases in which calomel was used; the average quantity taken by each patient; the number of cases in which mercurial action followed its use; and the result.

No. of cases in which calomel was used,	—	100
Average quantity given, in grains,	—	35 grains.
No. of cases in which mercurialization followed its use,	—	4
Result—Died,	—	69
Recovered,	—	31

TABLE 8,

Showing the number of cases in which *rubeola cholERICA* appeared; the ages of the patients; form of preceding disease; stage of the disease at which it occurred; period of its access; length of time during which it lasted; quantity of calomel taken, if any; mercurial action, if any; and result:—

No of cases	Age of Patients (in years)	Form of Antecedent Disease		Stage of the disease at commencement of Rubeola Choleric	Period of access after commencement of illness (in hours)	Duration (in hours)	No. of grains of calomel taken, if any	Mercurial action, if any	Result	
		Choleraic diarrhea	Algid cholera						Died	Recovered
1	1½	—	1	Secondary fever,	208	48	25	—	—	1
2	8	—	1	Ditto,	220	48	77	—	—	1
3	16	—	1	Ditto,	292	72	10	—	—	1
4	16	—	1	Ditto,	192	60	24	—	—	1
5	19	—	1	Ditto,	192	72	42	—	—	1
6	24	1	—	Ditto,	240	72	50	slight	—	1
7	46	1	—	Ditto,	53	24	none	—	—	1
8	46	—	1	Ditto,	268	48	none	—	—	1
Total, 8	—	2	6	Secondary fever, 8	Av. period of access, 208½ hours	Av. duration, 55½ h.	—	1	—	8

TABLE 9,

Showing the number of cases, and per cent. mortality, in the aggregate, and in the two sexes.

	No. of cases	Died	Per cent. mortality
Males, - - - -	91	53	58.6
Females, - - - -	106	53	50.0
Total, - - - -	197	106	53.8

TABLE 4 A,

Showing the comparative results of different plans of treatment in the two stages of the disease; and the period under treatment:—

CHOLERAIC DIARRHEA.

Medicines given	Mode of Administration	No. of Cases	Average period of treatment, in hours	Result		Per cent. mortality
				Died	Recovered	
Sulphuric acid and opium, Mustard cataplasms, and external heat applied by means of hot water jars and cushions. Creosote water for a drink. In a few cases a dose of castor oil.	To an adult 10 drops of aromatic, or dilute sulphuric acid with 5 drops of tincture of opium in an oz. of water, were given after each liquid stool. To children proportionately diminished doses; in many cases were added a few drops of tincture of capsicum, myrrh, and camphor, - - Assiduously applied until the subsidence of all urgent symptoms. Creosote water ad libitum—made by adding 3 drops of creosote to a pint of water, Castor oil was given when there seemed to be liquid accumulation in the bowels. In one case the acid failed until the oil had been given, and had acted.	30	63½	—	30	—
Chalk mixture with aromatics. Mustard cataplasms and extl. heat as above. Creosote water as above.	To an adult was given, after each loose motion, an oz. of chalk mixture with 5 grains of aromatic confection, 10 drops of aromatic spirit of ammonia, and a like quantity of chloric ether. In some cases a few drops of laudanum were added; and in others, ½ dr. doses of tincture of catechu. For the most part this method of treatment was used only in the milder cases, -	10	89	1	9	—
Calomel. Mustard cataplasms and external heat as above. Creosote water as above.	To an adult 10 grs. of calomel were at once given, and subsequently 2 grs. every hour, or second hour, according to the urgency of the symptoms. When the stomach was irritable, a draught was given after each dose, consisting of liqr. bismuthi dr. i., chlorodyne, 10 drops; water, oz. i.; or liquoris bismuthi and ætheris chlorici, guttas, xv.; tinct. opii, guttas iv.; mixt camphoræ ad oz. i. - A dose of castor oil was given when indicated by the presence of accumulated fluid in the intestines. In one case the acid and opium mixture was given without effect before the calomel treatment was commenced, and in this case likewise, previously to the administration of the calomel, three draughts were given—one every second hour—consisting of tincture of opium, 10 drops, in ½ oz. of brandy.	5	114½	1	4	—
Purgatives. Mustard cataplasms and external heat, as above. Creosote water, as above.	Either a haustus olei ricini, or haustus rhei; usually combined with aromatics, and a few drops of tincture of opium and peppermint water—repeated, if necessary. Adopted in cases where imprudence of diet was the apparent cause of the attack, - - -	5	53¾	—	5	—
Expectant treatment. Mustard cataplasms and external heat, as above.	This treatment was adopted only in cases which appeared to be progressing to recovery, - - -	2	55	—	2	—
Diffusible stimulants, with opium. Mustard cataplasms and external heat, as above. Creosote water, as above.	Scruple doses of sal volatile and chloric ether, with 5 drops of laudanum, every hour until symptoms abated, - -	2	70	—	2	—
		54	hrs. min. 74 37	2	52	3·7

TABLE 3 B,

Showing number of persons, within decennial periods of age, admitted in stage of *collapse* (algid cholera); average period in hospital; treatment; and result:—

Age	No. of Cases	Average period in hospital		Treatment*	Result		Per cent. mortality.
					Died	Re-covrd.	
Under 10 years, -	26	H. 86	M. 1	21 were treated with calomel. In 3 of these cases concentrated solution of camphor was likewise given, and in 2 also inhalations of the nitrite of amyl; 1 was treated with the warm bath; 4 with diffusible stimulants, and in 1 of these amyl inhalations were likewise given; 1, arsenic; sinapisms and creasote water generally, -	15	11	57.69
10 to 20 -	19	135	56	In 13 calomel was given; and in two of these also a draught consisting of liquor bismuth dr. i, creasote m. ii.; chlorodyne m. x. in water oz. i. after each dose of calomel. In two cases in which there was intermitting action of the heart, sulph. quiniæ was given in doses of gr. i. $\frac{1}{2}$ and grs. ii. every 4th and every 3rd hour respectively, in 1 combined with chloric ether. 2 got stimulants; 4 diffusible stimulants with effervescent. In one case in which there was suppression of urine in the consecutive fever, the patient ultimately recovering, a diuretic draught was given every 2nd hour, consisting of tinct. digitalis m. x.; spirit juniper, dr. i.; spirit ether nit., dr. ii.; aquæ ad., oz. i. M. -	7	12	36.8
20 to 30 -	25	79	2	21 were treated with calomel, preceded by a draught of castor oil, in 4 cases; and in 9 followed by bismuth and chlorodyne draughts; oxygen inhalations were given in 2 cases, and nitrite of amyl do. in 1; venesection was practised in 1 case; 2 got diffusible stimulants and effervescent; 1 belladonna and permanganate of potass; and 1 arsenic, -	17	8	68.0
30 to 40 -	19	32	53	15 calomel, with sinapisms, heat, and friction; of these 3 got brandy, 1 spirit of camphor, and 1 amyl inhalations. In 1 case permanganate of potass constituted the treatment, and in 1 hyposulphite of soda, in doses of gr. x., in combination with co. tinct. of cardamoms and syrup of poppies of each dr. i. every 2nd hour; to these draughts tinct. digitalis (m. x.) was subsequently added, and the patient was dry cupped over the loins, in consequence of suppression of urine. 2 were treated with stimulants, -	16	3	84.2
40 to 50 -	20	58	50	14 calomel; and in 5 of these also a draught consisting of liq. bismuth, creasote, and morphia, was given after each dose of calomel. Camphor in 2; amyl inhalations in 1, and oxygen do. in 1. In 2 cases a draught of castor oil was given before commencement of calomel treatment. In 2 diuretic draughts of tinct. digitalis, n. s. ether, and s. juniper, were given every 2nd and 3rd hour respectively; 2 were treated with stimulants, -	16	4	80.0
50 to 60 -	10	24	48	9 calomel; in 1 of these bismuth, &c., draughts, in 1, also hyposulphite of soda, and in 1 oxygen inhalations were given. In 1 case there was no time for treatment, the patient dying half an hour after admittance, -	10	0	100.0
60 to 70 -	3	43	7	1 calomel; 2 diffusible and alcoholic stimulants—viz, sulph. ether, aromat. spirit of ammonia, spirit of camphor, and brandy; external heat, -	2	1	66.66
70 to 80 -	2	16	0	2 calomel; and in one of these diffusible stimulants also; external heat, -	2	0	100.0
Total, -	124	59	34		85	39	68.5

* For detailed account of the mode of administering the various medicines above-mentioned we beg to refer to Tables 4 A, and B.

TABLE 4 B,

Showing the comparative results of different plans of treatment in the two stages of the disease, and the period under treatment:—

ALGID CHOLERA.

Medicines given	Mode of administration	No. of cases	Average period of treatment, in hours	Result		Per centage of deaths
				Died	Re-covered	
Calomel. Mustard cataplasms, and external heat applied by means of hot water jars and cushions, were assiduously used. Creosote water (3 drops to the pint) for a drink. Diffusible stimulants at short intervals. When the vomiting was urgent the epigastrium was at once vesicated by the nitrate of silver.	To adults with urgent symptoms, gr. x. were given at once, and gr. ii. every half hour or hour afterwards, till a favourable change occurred or all hope was abandoned. To children proportionate doses. The calomel was placed on the posterior part of the tongue, and if rejected by vomiting, a draught was given after each powder, consisting of solution of bismuth, dr. i., creosote guttas iii., tinct. opii guttas vi., aque ad oz. i. m. Occasionally the creosote was replaced by 10 drops of chlorodyne. The circulation was fostered by hand-rubbing with flannel pads, and sometimes chloroform liniment, or equal parts of chloroform and sal volatile; also diffusible stimulant drops were given every 10 or 15 minutes, consisting of equal parts of tincture of camphor, tincture of capsicum, sulphuric ether, and sal volatile; 20 drops for a dose, in water. In cases where the calomel was constantly rejected mercurial inunction, with the addition of mercurial suppositories, was adopted.	95	73½	68	27	71·579
Stimulants and sedatives. Brandy, camphor, ether, ammonia, creosote, chlorodyne, &c. Mustard cataplasms and external heat, as above. Creosote water, as above.	Brandy was given to adults in doses of oz. i. to oz. ii., in water, every hour, or oftener, according to urgency of symptoms; 10 drops of tincture of camphor on a piece of lump sugar every 10 minutes, or the diffusible stimulant drops mentioned above. Chlorodyne and creosote were added in small doses where the severity of the vomiting appeared to call for them; these stimulants were sometimes given in iced water, or iced soda water. In some cases vesication of the epigastrium by the nitrate of silver.	21	55	12	9	57·14
Effervescent, viz., bicarbonate of soda and sal volatile, with lemon juice. Mustard cataplasms, external heat, and creosote water, as above.	Two tablespoonfuls of a solution of bicarbonate of soda, with 20 drops of aromatic spirit of ammonia, taken with 1 tablespoonful of lemon juice, every hour, or second hour, according to circumstances. In some cases vesication of the epigastrium.	3	142½	1	2	33·33
Arsenical treatment. Mustard cataplasms, external heat, and creosote water, as above.	Thirty drops of Fowler's solution in a tablespoonful of water at once, and 15 drops every quarter of an hour after until relief ensues. Vesication of the epigastrium with the nitrate of silver.	2	100½	1	1	50
Permanganate of potash and extract of belladonna. Mustard cataplasms, external heat, &c., &c., as above.	Dr. i. of the officinal solution of permanganate of potash with 10 drops of chlorodyne in an ounce of camphor mixture was given every third hour. Small doses of extract of belladonna, in pill, at intervals.	2	73	2	—	100
Hyposulphite of soda. Mustard cataplasms, external heat, &c., &c., as above.	Gr. x. of the hyposulphite of soda, with dr. i. of compound tincture of cardamoms and dr. i. of syrup of poppies in oz. i. of camphor mixture, every second hour. Subsequently, owing to suppression of urine, 10 drops of tincture of digitalis were added to each draught, the loins were cupped and mustard poultices applied.	1	37	1	—	100
		124	80h. 17m.	85	39	68·5

NOTE TO TABLE 4 B.—It will be observed that on adding the cases in Table 4 A and B a deficiency of 19 cases, out of the total of 197, will appear. These 19 cases are those of patients admitted in a moribund condition, and who were either dead before being carried into the hospital, or died immediately after. Such cases offering no opportunity for treatment, are rejected from these tables, which illustrate the effects of various modes of treatment.

We now propose to make a few general remarks on those points connected with cholera upon which we have not yet touched; and first, with reference to the disputed point of *Contagion*.

A most important question for a community amongst which cholera has actually entered, and scarcely less so for one threatened with its visitation, is, whether that disease is communicable by personal intercourse, or through the medium of clothes, furniture, merchandise, &c. It is our decided opinion that cholera may be communicated in both these ways, and *that it is therefore contagious*, but in a degree inferior to many endemic diseases; for example, small-pox, typhus fever, scarlatina, measles, and hooping cough. This question is of such vast importance at the present time, that we hope to be excused for adducing in support of the opinion just given, not only the evidence afforded by our own experience during the late epidemic, to which this report has immediate reference, but likewise such examples of personal and fomite contamination from other sources as seem well established.

The late Dr. Graves^a gives the following instances. The first was communicated by Mr. Ellis:—"A fisherman, named Kenny, seeking the price of oysters sold to a person living in Great Britain-street, in Dublin, was told that the party who owed him the money was lying dead of cholera in the room adjoining the shop or cellar; he waited, however, until he obtained the money, and on his passage from Dublin to Arklow, was attacked with cholera, and died on the following day in his own house. The second and third cases of cholera which happened in Arklow were persons who had been in attendance on this fisherman, and his wife and child were the fifth and sixth cases."

This statement has reference to the epidemic '48-49—Arklow having been, previously to the importation by this fisherman, free from cholera.

The following case, of which an extract is given, was reported to Dr. Graves by Mr., now Sir William Wilde:—"For many weeks the sanitary cordon (around the village of Kilmaine, which is on the road between Galway and Castlebar, both places then devastated by cholera) was preserved with great strictness, and no one was permitted to remain in the town, who, it was believed, had come from any of the infected places around, until a family removing from Galway to Castlebar arrived late at night in the

^a Dublin Quarterly Medical Journal, February, 1849, page 36 *et sequent*.

village, unknown to the police or the usual watchers, and took up their residence at the house of a man named Mulvey, a shoemaker, where they remained till morning, but departed early, fearing the police. I subsequently learned that this family proceeded to Castlebar, the wife being at the time ill of cholera, where she died a few hours after her arrival. The next day the shoemaker in whose house the family had sojourned for the night, was attacked with cholera. The case lasted more than two days, and the man appeared to die of the consecutive fever."

Deputy Inspector-General Barrow^a gives the following strong exemplification of the spread of cholera by contagion;—we give an epitome of his report. The emigrant steamship, "England," left Liverpool for New York on the 28th March, 1866, having on board 1,200 persons, including the crew. On the 2nd April cholera broke out amongst the passengers, and on the 9th the ship put into Halifax in distress. The disease spread so rapidly on board that in the twelve hours ending on the morning of the 11th, *forty deaths* had occurred. On the day of the ship's arrival at Halifax (9th), a pilot boat containing three persons, a pilot, named Terence, an assistant, Purcell, and the son of the latter, approached the ship, and were by it towed to some distance by means of a ten fathom rope, and having sent their official papers on board, they departed without having boarded the ship. Purcell returned to his home, a distance of eleven miles from Halifax, on the following day (10th); on the 11th he had an attack of diarrhea; this continued; and on the 15th vomiting was superadded. On that day two of his children, aged three and five and a half years respectively, were seized with vomiting and great weakness; on the 16th his eldest daughter, aged fifteen years, was attacked with all the symptoms of true Asiatic cholera followed by severe consecutive fever. There were no deaths in this family. Mr. Barrow, who visited the man's house, and obtained the particulars from himself, declares that the house was in a high sanitary condition as regards situation, air, and cleanliness.

Terence again visited the "England" on the 10th, as pilot to the block-ship "Pyramus," to be used as an hospital, and having received back his papers sent on board the preceding day, he returned to Halifax without having gone on board the "England,"

^a Narrative of the late outbreak of Asiatic cholera on board the steamship "England," by Deputy Inspector-General Barrow, P.M.O., Halifax, N.S., in Army Med. Reports for 1864.

as affirmed both by himself and the captain of the ship. On the night of that day (10th) he was seized with purging, vomiting, and cramps, in a lodging-house in Halifax, and next morning returned home in a boat to Portuguese Cave, where Purcell lived; collapse set in, followed by low fever, of which he died on the 19th, after an illness of nine days' duration. On the 14th April, three days after Terence's return home, his daughter, aged five years, was seized with cholera, and died after an illness of fifteen hours. Next day (15th) three other children were attacked; of these, one, aged three years, had slept with her father; she died on the 17th with all the symptoms of cholera. Another, aged nine years, was seriously ill, but recovered after a consecutive fever; a third, aged one year, was on the point of death but recovered. Of five children in this family, only one escaped cholera, and he slept in a room apart from the others, and was out of doors all day; the mother also escaped. The cottage in which this family resided was also visited by Inspector-General Barrow, and found in a filthy state.

There had been no cases of cholera in Halifax or in the province for several years previous to this date.

It is noticeable, in connexion with this report, that there had been no direct personal communication between the passengers of the "England" and the men Purcell and Terence; nor was there any indirect communication between the former and the ship, except through the atmosphere. The attack in this case, therefore, must be regarded as an example of cholera *infection*; but in the case of Terence, there was indirect communication through the papers taken on board on the 9th, and returned to him on the following day; and, therefore, possible contamination also *per fomites*.

Dr. Hardie, surgeon 73rd Regiment, has recently,^a in an excellent memoir on the doctrine of cholera-contagion, given the following example in support of the affirmative view:—"At this time I was quartered in the barracks of the Port of Flacq, a village and harbour on the opposite (windward) side of the island (Mauritius) to Port Louis, and twenty-one miles distant. All was apparently well at the port, so far as I knew, up to the 30th May. On that day a Mr. Rénaud came down from Port Louis (where cholera then raged) with his family, ten in number, on a visit of flight to Mr.

^a Illustrations of the Doctrine of Contagion in cholera, drawn from the Epidemics of 1854 and 1856 at Mauritius, read before the Cork Med. and Surgical Society, session 1866-67, and published in the Dublin Quarterly Journal, Feb., 1867.

Véron, whose family numbered twelve, exclusive of seven servants. The family occupied a small one-storied house of two rooms and outhouses.

“On the 31st I was called to see the infant child of Mr. Rénaud ill with purging and vomiting. The child, which was at the breast, had had diarrhea before leaving Port Louis. It recovered, but another of the children, aged three, died of cholera after forty hours' illness, on the 2nd June. From this day onward this house was a scene of constant misery and death. The child was buried on the 3rd, and the Rénauds returned to Port Louis the next day. The same day Mrs. Véron and her son, who had both been assiduous in their attention to the children, were seized with cholera; Mrs. Véron died that night, the son on the 6th. The eldest daughter was seized on the 7th. Mr. Véron was seized on the 10th, and died on the 12th. On the 14th another daughter died; on the 15th one of the servants; and on the 16th an old friend who had assisted in nursing them, died. Two servants died on the 18th, and on the 20th another servant and child. Two more of the family were attacked, but recovered.

In all, between the 31st May and the 21st June, there were sixteen cases in this one house, of which eleven proved fatal.

Contagion here showed itself in its full potency. The house, with its outhouses, was much too small for the original family. The overcrowding of ten more, laden with the germs of cholera, will adequately account for the pestilential outbreak, with its catastrophe.

Dr. Hardie very truly adds:—“No more direct proof of importation and contagion can well be adduced.”

In the *Lancet* of August 11th, 1866, the following example of contagion is reported from Guy's Hospital. “A. B. and C. are sisters, and W. is their sister-in-law. A., who lived near Temple-bar, washed the clothes of a cholera patient, took the disease, and died. During A.'s illness, B. C. and W., who lived together in Park-street, Bermondsey, a locality then free from cholera, went to her, and after her death returned home. The same evening B. was taken ill with cholera and died the following morning. Two hours after *her* death, C. was attacked, and died within two days in the hospital, whither she had been brought. W., shortly after this death, was attacked in the morning with pain in the stomach and diarrhea; she was likewise admitted into Guy's Hospital, where she was treated for cholera, which passed on to collapse.

Deputy-Inspector General Maclean, Professor of Military Medicine in the Army Medical School, Netley, in a lecture, published in the *Lancet* of February 3rd, 1866, furnishes a strong body of evidence in support of the conclusion at which he has arrived, namely, to use his own words:—"That the pestilence is propagated by human intercourse, and in all probability, mainly by the poisonous action of the excretions of the affected after they have undergone certain changes."

In reference to this point, we would specially call attention to the recent account of the epidemic of cholera of 1866, in Bristol, published by Dr. Budd, in the *British Medical Journal* of April 13th, 1866.

Dr. Budd, in addition to other valuable information, gives very strong evidence to show that cholera is communicable by contagion; he says:—"From that time (21st July, 1866) to the 12th of November following, the disease made its appearance in twenty-four other distinct localities, making, in all, twenty-six infected spots. In five of these instances, as in the case from Rotterdam (making six altogether), the disease was distinctly traced to importation from without. In five others importation was probable, but could not be actually proved. In two the disease was derived from a previously infected spot in Bristol itself. In the remaining instances, to the number of thirteen, the source of the infection could be neither made out nor guessed." It would thus appear, that in addition to the first case, which Dr. Budd proves to have been imported in the person of a sailor from Rotterdam, where cholera was in active operation at the time, importation from infected centres was the immediate cause of attack in five instances. In five others it (importation) "was probable, but could not be proved," whilst in thirteen instances (each having, as in the preceding instances, a distinct locality in the city, and being the first case that occurred there, as shown in Dr. Budd's map), no clue could be obtained as to the mode of entrance of the disease.

From time to time examples of invasion similar to those last mentioned, will, of necessity, be presented, in which the contact theory fails to afford a full explanation. But are we in possession of *all* the facts connected with these cases? In the case of Mrs. Gaffney, given at page 376, we were all at fault for several days in regard to the mode of communication of cholera, till the circumstance of her having slept in an infected lodging-house the night before she was admitted into hospital, was accidentally brought to light. If

this had not occurred her case would be regarded, as are many others of a similar kind, as affording negative evidence against contagion. The remarkable outbreak of cholera in the Mountjoy Prison on the 23rd December last, as reported by the medical officer, Dr. Macdonnell, to the College of Physicians, as also the two isolated cases that occurred in the General Prison at Perth, and were reported by Professor Christison and Mr. Thompson,^a are simply inexplicable according to our present knowledge; but, it is worthy of remark, that both in Dublin and in Perth, cholera existed epidemically at the time these institutions were visited by it, and that the most rigorous measures of isolation and disinfection were immediately adopted. To this, no doubt, as in the case of the Bristol epidemic, the rapid disappearance of cholera from these two prisons should be ascribed.

The members of "International Sanitary Conference," in their report on the origin, &c. of cholera, given in abstract in the *Medical Times and Gazette* of October 6th, 1866, have arrived at the following, amongst many conclusions, viz.:—"All the facts at their disposal prove convincingly that cholera is propagated by man, and with a rapidity which is greater the more active and expeditious his migrations."

That "it is a law, up to the present time without exception, that cholera has never marched more rapidly than man in his migrations; that it has radiated to, and declared itself only in, those places where there have been communications with infected places, and in no others.

"The Commissioners are acquainted, up to the present time, with no fact to prove that cholera can be propagated to a distance by the atmosphere alone, whatever its condition may be."

In these conclusions the Commissioners were anticipated by twenty-six years, by the late Dr. Graves of this city, who, in his most learned and elaborate paper. "A Sketch of the Origin and Progress of Asiatic Cholera," published in January, 1840,^b writes:—"It is remarkable that it (cholera) never traversed the ocean at a rate exceeding that of ships."

Surgeon Leith Adams and Assistant-Surgeon Walsh, in their report on the cholera epidemics of 1865 at Malta,^c state that the

^a British Medical Journal, Jan., 5th and 19th, 1867.

^b Dublin Journal of Medical Science, Vol. xvi., Old Series, page 369.

^c Army Medical Reports, 1864, page 331.

first undoubted case of cholera among the natives occurred, July 1st, at the village of Birchcara, in the person of a white-washer. This man had been employed two days previously at the Lazaretto, where the disease already existed, and died at his own residence, the case being returned as "gastro-enteritis."

In his report on the outbreak of cholera at Finglas, in 1854, Dr. C. F. Moore^a states, on the authority of Dr. Hill, Medical Inspector, that "The first case of cholera was a labourer who had just returned from Belfast, and became ill after drinking a gallon of porter, and eating a liberal supply of bacon for his breakfast. This was on August 13th; he recovered, but shortly after, two cases occurred in the same house, in children, one of whom died on the 20th August." "The number of cholera cases recorded to the 24th September, from its first appearance on the 13th August, was sixty-six, of which twenty-eight proved fatal."

"It is said about 100 persons fled out of the village on the 18th and 19th, of whom it was ascertained five died within a few days, one in Liverpool, and the others within the environs of Dublin. Some of these refugees were the means of conveying the disease to another locality favourable for its development, where, in a few days, twelve persons died out of a very small number of inhabitants. The cottages, composing the hamlet (Kill-of-the-Grange), being badly ventilated and dirty, and the drinking water very indifferent."

A medical gentleman of this city has furnished us with the following particulars:—In August, 1849, two relatives of his, an old gentleman and lady, came up to Dublin from the country, with the view of spending some weeks at the seaside. They took apartments at Blackrock, and on the following day our informant was hastily summoned to visit the lady, who was reported seriously ill. On arrival at the railway station he engaged a car to drive him to his friend's lodgings, on approaching which, the driver, knowing he was a medical man, enquired in a very significant manner, whether "there was any one else sick there." On being questioned as to his meaning he declared that on the morning of the preceding day a person who had died of cholera had been removed for interment from that house. The lady who, as was afterwards ascertained, occupied the room and bed vacated by the cholera patient on the previous day, had a severe attack of cholera, from which she was convalescent, when her husband became affected with choleraic

^a A Sketch of the Recent Outbreak of Cholera at Finglas. Dublin Quarterly Journal, Nov., 1854.

symptoms, and imprudently announced the fact to her. She was unfortunately of a nervous temperament, and, as a consequence of this startling intelligence, had an apoplectic seizure which carried her off. The husband, who was likewise attended by our informant, recovered after a protracted illness; but a servant of the house, who was subsequently attacked, died. These parties came from a part of the country where cholera had not appeared; they had no apprehension of danger from cholera, and were entirely ignorant of the antecedents of the house in which they lodged.

The recent importation of cholera from Liverpool, with the consequences of which we all have been made familiar, as detailed by the able and efficient officer of public health, Dr. Mapother,^a affords a convincing illustration of the contagiousness of cholera.

Dr. Alderson^b quotes from a French source experiments made upon animals with the *excreta* of cholera patients; these were given, soaked in bibulous paper, to the animals in their food.

No effects followed when the *dejecta* were administered three days after being passed; but when given between the third and the sixth day they produced most of the symptoms of cholera, viz.:—purging, cramps, suppression of urine, and convulsions ending in death. After the sixth day they were found to be inert.

M. Robin^c has likewise proved experimentally the infectious property of the vomited and excreted matters of patients suffering from cholera, by injecting them into the veins and trachea of two dogs; to a third dog he administered the matter vomited by a fourth, which had drunk the blood and serum of a cholera patient. “In all there were vomiting and other symptoms of cholera.”

The following case is extracted from our own Registry:—

Bridget Gaffney, aged twenty-seven, a native of the County of Meath, was admitted into hospital on the 6th November, '66, in charge of her infant, upon which she wished to have an operation performed for talipes. The woman was in good health, and occupied, with her child, a bed in the female surgical ward, on the second floor of the hospital. There was no communication whatever, direct or indirect, between the inmates of this ward and the cholera patients, who occupied two wards on the third or upper floor. Each of these wards had a separate staff of nurses and assistants, and no contact or approach was permitted, or possible, between the two

^a Lectures on Public Health, Enlarged Edition, February, 1867, page 440.

^b Lancet, January 12, 1867.

^c Lancet, January 13, 1866.

classes of patients. The woman Gaffney was seized with cholera in the surgical ward on the morning of the 13th November, and was at once removed to the cholera ward up stairs, where she died at nine o'clock that evening. Some alarm was felt in consequence of this case, lest cholera was about to spread amongst the general patients of the hospital, and the most strict and searching inquiry was instituted, with the view of ascertaining whether the woman had approached the cholera wards, or been in any way exposed to contagion in the hospital. The result was the conviction that no such exposure had taken place, and that during the period of her residence in the hospital, previously to the choleraic seizure, she had not once gone beyond the adjoining corridor. No other patient was attacked with cholera in the hospital, either previously or subsequently. The uneasiness at first felt had entirely subsided, and Mrs. Gaffney's case had been placed in the category of cholera puzzles, when, on the 16th November, her husband came up from the country to take home the child, and in a conversation with one of the Sisters relative to his wife, remarked that on the night of her arrival in Dublin she had slept in a lodging house where cholera had been, and suggested that it was there she took the disease. Inquiry was at once set on foot to find out this lodging house, and ascertain all particulars relating to it. The result was as follows:—The house was 20 Greek-street; the woman Gaffney and her child slept there on the night of November 5th. In that house there had been a case of choleraic diarrhea on the 20th September; and in the adjoining house, No. 21, no less than five cases of well-marked cholera had been treated by the district medical officer in the interval between the 12th September and the end of October. From the next house but one, No. 22, one case of cholera had been admitted into the Mater Misericordiæ Hospital on the 14th Sept.; and from No. 24 two cases on the 14th and 17th September respectively. From No. 10 in the same street another case was admitted on the 23rd October.

Thus, on the night of the 5th November this poor woman had unconsciously placed herself in a *focus* of cholera; for, irrespectively of the case that occurred on the 20th Sept. in the house in which she stayed, there had been, within a short time previously, no less than *nine* cases in the immediate neighbourhood. It will be difficult to resist the conviction, indeed no other explanation seems admissible, that this woman, who had come from a district of the country where cholera had not appeared, received the poison of the disease

in the house 20 Greek-street on the night of the 5th November; and in the week from the 6th to the 13th November, during which she was in hospital, developed the germs so received into a fatal attack. In this case, therefore, it would appear that the period of incubation was *seven days*.

Upon reviewing the registry of cases admitted to the Mater Misericordiæ Hospital, we find that in a very large proportion contagion, or infection, are distinctly traceable.* It would occupy too much space to enter into the history of each in detail, but we cannot refrain from quoting the following instance.

On the 29th of October a young woman named Mary Hart, and her infant, aged two months, were admitted. Both were in the collapsed stage of cholera. The child died the evening after admission—the mother rallied, and was convalescent by the 4th of November. The history she gave was as follows:—She had been living in the County of Kildare, and had placed her child at nurse with a woman residing in Cork-street, Dublin. Hearing that this woman was ill, she came to town a few days before her admission to the hospital, and finding the nurse ill of cholera, took away her baby, which at that time was perfectly well. They went to a lodging in Kelly's-row, off Marlborough-street. Next day the baby sickened; the following day she herself took ill with vomiting, purging, and cramps, and, as before stated, both entered the hospital collapsed in cholera. It is not easy to set aside the belief that in this case contagion played an active part.

Many other confirmatory circumstances might be adduced, such as the appalling fatality amongst those students in Paris, who so heroically devoted themselves in the late epidemic to nurse-tending and hand-rubbing the cholera patients; but we shall confine ourselves to the mention of one more case which came under our special notice.

One of the writers of this report (Dr. Cruise) was called upon in the afternoon of the 26th of October to visit a clergyman at Clondalkin, in consultation with Dr. M'Crea. On arrival at four o'clock p.m., the patient was found collapsed in cholera, and despite of treatment he sank rapidly, and died that night.

The history of his case was as follows:—The night previous he was summoned from his bed to administer the rites of the church to a poor woman in Clondalkin, who was labouring under cholera, of which she died.

* See Table 5.

Having remained with her for some time, he returned to bed; awoke, ailing, next morning; sickened decidedly about eight o'clock, and soon had such marked symptoms that Dr. M'Crea of Clondalkin was called in. He at once pronounced the disease to be cholera, and prescribed accordingly.

Notwithstanding prompt aid the patient sank, and by the afternoon was in a hopeless condition.

Let us now investigate the history of the poor woman, in attendance upon whom this clergyman thus nobly sacrificed his life. The facts are these:—She had a brother who resided in Kingstown. A few days previously this brother took cholera and died. She repaired to Kingstown for the wake—remained there three days, and on her return to Clondalkin immediately took ill of cholera and died.

We think it difficult to resist the conviction that in these cases the propagation of the disease was effected by contagion. It may be urged by non-contagionists that such instances are merely coincidences; nevertheless we hold that a fair and natural interpretation of the doctrine of probabilities—and, in truth, all medical belief must finally rest upon probability, greater or lesser—leans irresistably in the opposite direction.

Receptivity and Resistance.—Immediately connected with the question of contagion in cholera arises that of the capacity of receiving or resisting its poisonous influence. A state of good health on the part of individuals and communities is eminently unfavourable to the invasion of cholera. By this assertion is not meant the absence of positive disease, but rather of that depressed standard of health, short of actual disease, in which most of the vital functions are performed indifferently; the appetite bad; the stomach and bowels deranged; sleep broken; the pulse slow and feeble; languor and depression of spirits habitual. This state of health, most frequently due to irregularities in diet, the use of unwholesome articles of food or drink, the respiration of impure air, or actual want of the necessities of life, constitutes what is known as an “unfavourable hygienic condition.” A state of individual and public health the reverse of this confers a vital resistance to the poison of cholera, or immunity from attack under circumstances of exposure to cholera contagion.

It occurs to us that herein may be found an explanation of the disagreement amongst physicians as to the contagious properties of cholera. Thus, one observer may witness an indubitable example of

contagion, or, perchance, many such, and become thenceforward an advocate of the doctrine of *contagiousness*. In this case or cases, presumably the two necessary conditions of exposure and receptivity were supplied, and hence the *positive* result witnessed.

Another person may have witnessed one or more cases in which, the degree of exposure being the same as in the former, contamination, nevertheless, did not follow, and may have become, in consequence, a staunch supporter of the doctrine of *non-contagiousness*. In the examples presented to him the condition of receptivity had been wanting, and hence the negative result from which he deduced his opinion. Let these two persons meet and discuss the subject of cholera contagion—each will probably unsettle the opinion of the other, and no definite conviction will remain to either.

Should the same individual have witnessed the opposite results mentioned, he cannot have arrived at any definite opinion on the subject, as deduced from his own experience, and will remain neutral in regard to this question.

In these hypothetical examples the error is one, not of fact, but of observation, and consists in the omission to take cognizance of the actual state of health of the parties exposed to the contagion. We feel certain that numerous examples, equally illustrative of of this error, might be adduced from actual practice, and that, to the confusion thence arising, may be in great measure attributed the present unsettled state of opinion as to the communicability of cholera from person to person.

The immunity from attack of infants at the breast, even when sleeping with, and subsisting upon the suck of cholera patients, deserves to be noticed in connexion with this part of the subject.

The following are examples of this kind:—

Dr. Maxwell Adams says:—"In nine instances children at the breast escaped the disease, although their nurses laboured under it."

Dr. Brassington^b mentions the case of a young mother attacked with cholera who continued, whilst in cholera, to suckle her infant child in the same bed with herself, as long as she had suck to give it. The mother died of the disease, as likewise did her little boy, aged two years, *but the infant was not affected*.

The woman Gaffney, who was attacked with cholera whilst an inmate of one of the surgical wards in the Mater Misericordiæ Hospital, as already stated, likewise continued to suckle her infant,

^a Edinburgh Med. and Surg. Journal, Vol lxxii., 1849, p. 306.

^b Medical Press and Circular, October 24, 1866.

ten months old, up to the time of her removal to the cholera ward. The mother died on the evening of her removal, but the child remained unaffected, and under observation in the hospital for three days, when it was taken home. It has been since heard of, and was at the time in good health. We may quote here another similar case:—

Eliza Young, aged 24, was taken ill with purging and vomiting in the forenoon of September 24th. At five o'clock, p.m., she was admitted into the Mater Misericordiæ Hospital, being then perfectly collapsed and livid, and having nursed her baby up to the time of admittance. The baby was then taken from its mother, who died the following day, *the child continuing unaffected*.

On the other hand, we have met one instance in which an infant at the breast appeared to have contracted cholera from its nurse, in the person of Mary Hart's child, mentioned at page 378.

Were infants, circumstanced as in the preceding instances, in a condition favourable to the development of the cholera poison, they could not escape attack, even though the mammary secretion were untainted, which is very improbable; for the infant, occupying the same bed with its nurse, must absorb in some measure the exhalations from her lungs and skin, and the vaporized excreta with which her dress and bedding are soiled. Yet no authenticated example, with the above single exception, of an infant so circumstanced taking cholera from its nurse has come under our notice.

A healthy infant, nourished exclusively at the breast, offers a typical example of a human body in a purely physiological or normal condition. Its food is unsophisticated, and contains, in the requisite proportions, the elements necessary for its sustenance and growth, *and no other*. Its sleep is regulated only by the requirements of its system, and its clothing selected and fashioned to retain warmth, without restricting the natural movements of the chest and abdomen. Such a condition of body, as being the antithesis of disease, is eminently antagonistic to the development or reproduction of morbid matter.

Similarly exposed to the contagion of small-pox, scarlatina, or measles, if unprotected by vaccination or by a previous attack, it is well known that infants rarely escape; but as the condition of body, and the degree of morbid receptivity is presumably the same in all these cases, the difference in the result must be due to the more intense infectiousness of the diseases mentioned as compared with cholera.

It is right, however, to mention that a case has been seen by one of the authors of this report in which a baby continued to suck its nurse up to the seventh day of typhus fever, and yet escaped without contracting the disease.

We are not disposed in this report, which is intended mainly as a commentary upon the result of our own observations, to enter upon a lengthened discussion of the arguments put forward by non-contagionists; we shall merely, in passing, allude to these most frequently dwelt upon.

It is often urged that cholera is not propagable by contagion, because cases occur under circumstances where it is impossible to trace their origin to this cause. We grant that such cases occur, but add in reply that the same must be admitted in reference to typhus, small-pox, and other acknowledged contagious diseases. Again, it is urged that cholera is not contagious because instances can be named of prolonged and thorough exposure without the spread of the pestilence. To this we answer that precisely analogous examples of non-propagation of typhus, scarlatina, &c., can be produced.

The greater number of physicians who have had large experience of cholera in India are non-contagionists. While we duly respect their opinions we cannot relinquish our own—namely, that cholera, as we have seen it in this country, and as the bulk of information upon the subject which we have been able to obtain, inclines us, is decidedly propagable by contagion, although in a lesser degree than typhus, scarlatina, and the like complaints.

In brief, we believe that cholera is propagable by contagion; that two elements play essential parts in its transmission—namely, *first*, the active element, or poison; and *secondly*, the passive element or capacity of receiving the poison. We think that there is no evidence hitherto brought forward to support the theory of non-contagiousness, which might not with equal truth, though in a different degree, be adduced to prove non-contagiousness in typhus, scarlatina, small-pox, and other diseases admittedly contagious. In fine, we conceive that the most righteous and humane course which we can take is to declare this opinion, regardless of the moral effect upon the multitude, convinced that the knowledge of the truth is the true key to the means of prevention of this terrible scourge, and the consequent saving of human life.

Atmospheric influence.—We have already expressed our opinion that in a limited space, the atmosphere may become so charged with

the poison of cholera, as to be capable of communicating the disease to receptive subjects who come within its sphere. It would seem also, that air so impregnated, if confined in a close space, may retain its specific contaminating property in undiminished potency for several months.

The following is an example in point, and is quoted from Dr. Hardie, Surgeon, 73rd Regiment.^a

“About 300 yards from the sugar-mill of Clemencia we stopped at a closed shop, near which are several cottages of creoles, from whose account we got as follows:—

“During the first epidemic (1854, at Mauritius), about four months since, two persons, one of whom was the owner of the shop, had died of cholera, since when it had remained closed. On the 13th of this month (November), Madame Alfred, sister-in-law of the former owner of the shop, wishing to know if her shawl was in the house, had a window-shutter opened, put her head through the window and saw her shawl on the floor; she did not remove it, but remarked, on withdrawing her head from the room, that she was “*Frappée par la mauvaise odeur.*” The same night she had looseness in the bowels. She went into the woods next day, but during that night became worse, and next evening cholera had fairly declared itself. She died on the 17th. A child whom she had adopted, aged two, was taken ill the same evening, and died the same night.”

This case is an example of *cholera infection*; for, it will be remembered, the woman did not even touch the shawl. It further shows that the air of a cholera apartment, confined for a period of four months, may, at the end of that time, communicate the disease.

In the course of the recent debate on cholera, at the College of Physicians, Staff Surgeon Major Laing, said:—“I was stationed in Kurrachee, in Scinde, in the month of June, 1848; cholera came on on the 14th of June, and in the first twenty-four hours one hundred men came into hospital. It appeared as if a cloud came across the sun; and at six o'clock that evening the men began to come into hospital; and before seven o'clock there were thirty men lying dead. The disease went on for ten days, and in that time we lost two hundred and forty men. The men suffered dreadfully; but of the officers in the cantonment only one was attacked, and he

^a Illustrations of the Doctrine of Contagion, drawn from the epidemics of 1854 and 1856, at Mauritius. Dublin Quarterly Journal, February, 1867, page 243.

recovered. The atmosphere was most oppressive. It was a remarkable fact that the Brahimine kites and crows which collected about the cantonments to pick up the offal *disappeared altogether, and did not return until all the cases of cholera had ceased.* The domestic fowls about the cantonment died; and I was told that the sheep in the neighbourhood suffered severely." These observations are of great value in reference to the question of atmospheric contamination, or the existence of an "epidemic constitution" of the atmosphere in districts actually suffering from cholera.

Fomites.—Of the communicability of cholera by fomites, such as the dress and bedding of cholera patients, the following examples are forcibly illustrative:—

The three first are taken from Dr. Graves paper.* "Mr. Beatty, the apothecary who died in Sligo, was a Tirera man, and when he died his clothes were bundled up and sent to Tirera; the girl who took them to the river, where for safety they were sent to be washed, was attacked with cholera that night, and died."

The particulars of the three following cases were furnished to Dr. Graves by Dr. Nelson of Killala, in whose practice they had occurred.

"When the cholera raged at Ballina, as elsewhere, the panic was considerable; they buried clothing, and destroyed bedding, &c., by throwing them into the river Moy.

"About a mile down the river a fine feather bed was seen floating, by a woman, who carried it off about ten miles from Ballina, to the village of Mullinacrush. She was seized with cholera that night, and died in a few hours. Her sister, in the same house, sickened and died in a few hours after. Three children in the same house were all attacked, of whom one died, and the immediately adjoining houses were attacked. A female friend, who lived in an isolated cabin, visited this house, and was attacked immediately on her return, and died. No other cases occurred in the neighbourhood."

"Cholera first appeared in Tuam (Co. Galway), on the 4th of June, 1832, having attacked Galway, the nearest seaport, on the 12th of May preceding. The first case was a fish kedger's wife, *who had purchased the clothes of a woman who died in the cholera hospital of Galway.* She died the following night. Her sister, from a remote part of the town, who attended her and washed her body, was the second. A relative from a neighbouring village,

* Dublin Quarterly Medical Journal, February 1st, 1849, page 32, *et sequent.*

who also attended her and assisted in the washing, was the third. None lived above twelve hours."

"Cholera ceased for the first time in Tuam in August. The bedding was all put up clean in store. In September the courthouse (which had been our hospital) was required for the sessions. Mr. Hartnett, the dispensary apothecary, with two other persons, were employed for nearly a whole day in the removal of the stores. *Mr. Hartnett and one of the men were seized with cholera the following night, and both died.* There had not been a case of cholera in Tuam for upwards of a month." This case likewise exemplifies the retentive property of clothing in regard to the infectious principle of cholera, when stowed away, and not freely exposed to the air.

The next example is taken from the report of Surgeon Leith Adams, and Assistant-Surgeon Welsh^a on the epidemic of cholera at Malta in 1865:—

"On the 3rd of July it (cholera) proved fatal to a woman in Valetta. She was a tailoress, and had received, four days prior to her decease, old clothes, as patterns, from a merchant's family fourteen days arrived from Alexandria, in a vessel with cholera on board."

Deputy Inspector-General Barrow gives the following example of contagion by fomites:^b—"A poor man named Evans, his wife, and two children, lived in a miserable and unwholesome house near the sea, at a place called Freshwater, the southern suburb of Halifax. A large quantity of bedding, saturated with cholera discharges, had been thrown overboard from the ship "England," and for many days allowed to float about the harbour. Some of this bedding had drifted ashore at Freshwater, and Evans' children had been seen playing with it; it is even more than suspected that the Evans family had lain upon a mattress so obtained. On the 22nd of April Evans' eldest child, a girl about two years, was seized with cholera, after having had diarrhea for nearly a week; she died next day in the city hospital. The entire family was then sent to the hospital, and kept in a state of isolation. On the 24th the second girl, aged thirteen months, was attacked; her case was severe, but she recovered. The mother, aged 35, was seized on the 25th, and died of exhaustion on the 30th. These cases (he adds) prove the infectiousness of cholera, and the communication of the disease by fomites (infected bedding)."

^a Army Med. Report, 1864, p. 331.

^b *Opus citat.* Army Reports.

Dr. Mapother,^a writing of the recent epidemic in this city, says:—"The clothes of some cholera patients who had been in the Meath Hospital last August were sent to be washed by a woman residing in Chamber-street, where the disease had not been previously, and in three days she was seized with cholera, which proved fatal to her and to a man residing in the same house, and spread extensively in that street, which is built along the Poddle."^b

The persistent adhesion of the poison of cholera to the dress and furniture of the infected, taken in connexion with the remarkable tenacity of its specific contaminating property, exemplified in some of the foregoing cases, would seem scarcely reconcilable with the opinion that it is of a gaseous, or of an inorganic nature; whilst, on the other hand, these characteristics are eminently distinctive of organic germs.

Water.—That water may serve as the medium of communication of cholera is now generally conceded. The following examples show the agency of water in the production of cholera in a strong light. Dr. J. W. Bain^c writes:—"The same localities are attacked as before, but with one remarkable exception. In one entire street, where in the epidemic of 1849 forty-three persons died of cholera in a month, not one case has occurred. As this has never been published I may mention it now. The street is Cold Harbour, at Blackwall, running parallel to the river. About one-third of the houses face the river, and were supplied, in 1849, with filtered water from a barge coming out twice a week from the West India docks. The remaining two-thirds on the land side of the street were supplied with water from a pump. *Forty-one of the inhabitants of this side died, and only two on the other, and it is believed that these were in the habit of sending for the pump water.* After the epidemic had ceased it was discovered that the sewer in the rear of these houses, originally made of wood, had become rotten, and leaked into the well. I myself attended most of these cases, but at the time my attention was not drawn to the water supply, or its different distribution on the two sides of the street. The forty-one deaths occurred in about twenty-nine houses."

Dr. Thomas More Madden, in his recent valuable brochure,^d gives the following striking example of the contamination of pump-

^a Lectures on Public Health, February, 1867.

^b This statement, as regards the washerwoman, is confirmed in the abstract of report of cholera from the Meath Hospital.

^c Lancet, September 1, 1866.

^d A Statistical Inquiry into the Sanitary Condition of Kingstown, &c., 1867, page 5.

water:—"In one of the best terraces of Kingstown several deaths from cholera occurred, and measures of disinfection were adopted. At the same time the pump-water in one of the houses was observed to acquire suddenly a very remarkable and offensive taste and odour. An eminent chemist was now requested to analyse the water, and in it was found a large quantity of carbolic acid, together with organic matter. The explanation of this was, that a case of cholera had occurred next door, and that carbolic acid had been poured into the water-closet; and this led to the discovery of the poisonous character of the water."

Dr. Mapother^a gives the following example of a similar kind:—"After two cases of cholera, one of which was fatal, had occurred in the house of a friend of mine, which is situated in one of the best parts of that town (Kingstown); he poured a quantity of carbolic acid into the sewer, and found that the water of the adjoining well tasted of that substance for many weeks after."

The following cases are copied from our own hospital record:—John Thomas, aged fifty-three, mate of the ship "Olive," from Liverpool, called the "teetotal ship," because of the strict abstinence from all spirituous drinks enforced on board, was attacked with purging, vomiting, and cramps, at 8½ p.m., October 4th, and admitted into hospital at eight o'clock the following morning; he was then in profound collapse, and died at 3 p.m. the same day.

Thomas Hartley, aged sixty-three, captain of the same ship, was seized with cholera at ten o'clock on the evening of October 4th, and admitted into hospital at 9¼ a.m., on the 5th, in a moribund state, and died twenty minutes afterwards.

Willy Seamer, aged 17, cabin boy, also of the "Olive," who had attended the two former whilst sick on board, was attacked with slight choleraic symptoms at 11 p.m., on the 5th October, and was admitted at 10½ a.m., on the 6th; he was then suffering from diarrhea, nausea, and occasional vomiting. This boy, who was the only survivor of the crew of the ill-fated ship "Olive," was discharged cured after treatment in hospital extending over 168 hours.

Thus, on board this ship two persons were seized with cholera on the evening of the 5th October, and both died on the following day; and on the afternoon of that day (6th) the only surviving member of the crew was also attacked, but recovered after a protracted illness. Dr. Mapother^b reports:—"The drinking water of

^a *Opus citat*, page 458.

^b *Opus citat*, page 475.

the "Olive" was shown by Professor Cameron to contain *ten grains per gallon of organic matter, and infusoria visible to the naked eye.*"^a

In the foregoing cases, as indeed in most others of the alleged communication of cholera by means of water used in drinking, it is impossible to prove the introduction of the choleraic agent through this medium. Indeed, in the majority of such cases we are of opinion that the impure water operates by creating a *predisposition* to attack, the principle of infection being supplied through the air, rather than by serving as the medium of communication. It is, however, conceivable, and highly probable, that cholera is frequently communicated in this way.

Sewers and Privies.—Of the unfavourable influence of ill-constructed and neglected sewers and privies, in close proximity to human habitations, during an epidemic of cholera, the evidence is conclusive. The following are examples:—

In Dr. Barry's report of the cholera epidemic of 1848 at Malta, as it affected the 69th Regiment stationed at Lower St. Elmo,^b it is mentioned that "several cases of cholera occurred in rapid succession, and that it was specially noted that the greater number of cases were admitted from the rooms in the immediate vicinity of the common drain and men's privy; and that, moreover, on previous occasions these identical rooms had been frequently temporarily abandoned, on account of the great amount of sickness they had produced in comparison with others in the same barracks."

On the visitation of cholera to the same island (Malta) in 1850, Surgeons L. Adams and Walsh^c state that the "Ospizio di Vecchi (a peculiarly unwholesome establishment) as usual came in for its share early in the outbreak, as well as the madhouse, where everything sanitary was most defective. Here the disease raged with great virulence, and the unfortunate inmates dropped off in numbers, until suspicion was aroused that the general state of filth, and an extremely noisome latrine, might have something to do with the evil. This was at once filled up with lime, and the cholera as quickly disappeared from the establishment."

On Professor Pettenkofer's theory of the mode of propagation of cholera we do not undertake to offer an opinion, beyond this, that the denial of the communicability of cholera by *direct contact*, as involved in that theory, seems very questionable, and is contrary

^a The italics are not in the original.

^b Quoted by Drs. Leith, Adams, and Welsh, Army Med. Reports, 1864, page 313.

^c *Opus citat*, Army Med. Reports, 1864.

to all our experience of the disease. Of this theory, which, in deference to the great reputation of its author, we feel bound to notice here, an excellent abstract has been published by Dr. H. Weber.^a Pettenkofer believes that cholera is propagated by human intercourse, and never without this, *but through the soil*, and not by direct contact. The two essential conditions are, human intercourse yielding the germs in the excretions of cholera patients, and the soil developing this germ into activity. As regards the soil, he holds that two conditions are essential to the propagation of cholera, viz., a porous character, and the presence of ground-water, or sub-soil-water, varying between five and fifty feet below the surface, the level depending upon that of the first impermeable stratum.

The most fatal period is when this water recedes from the surface, viz., in July and August. The cholera-germ must be developed in a suitable soil before it can become active, and it may then enter the body by inhalation, &c.

We now beg to submit the result of our observations on the symptomatology and morbid anatomy of cholera.

Action of the Heart.—In collapse we have noticed, in several cases, a total absence of the second sound, the first sound being distinctly audible and normal in character. The failure of the second sound has taken place, first, in the aorta, and, after an interval of a few hours, but varying with the gravity of the case, in the pulmonary artery also. For some time longer the first sound continued to be audible, ultimately failing, and in a few instances several hours before death.

This phenomenon is noteworthy, as indicating a dynamic state of the heart, the antitype of that witnessed in typhus fever, in which, as Dr. Stokes has remarked, the *first* sound of the heart is occasionally abolished, the second continuing unimpaired. In typhus fever the failure of the first sound has been justly attributed to softening and muscular debility of the ventricles, as noticed by Louis. In cholera, as is well known, softening of the tissues of the heart does not occur; on the contrary, the walls of the ventricles, especially the left, have been found firmly contracted and unyielding in nearly every instance in which an examination of the body has been made within a few hours after death. Herein, we believe, an explanation is to be sought of the persistence of the first sound in cholera-collapse. The absence of the second sound is probably due to the want of sufficient tension of the aorta and pulmonary artery to induce strong elastic reaction, and forcible and sudden closure of the semilunar valves.

^a Lancet, January 6, 1866.

It has been remarked by Skoda that obstruction of the pulmonary circulation, to whatever cause due, is followed, as a necessary consequence, by intensification of the second sound in the pulmonary artery; hence he regards an accentuated second sound in this vessel as of great value in the differential diagnosis of mitral valve-disease, a remark, the justice of which we have frequently verified. That in the collapse of cholera there is obstruction of the venous circulation in the lungs, the engorged state of the pulmonary artery and right side of the heart, found after death, clearly shows; hence, probably in the last stage of cholera, the continuance of a second sound on the right side for some time after it has ceased to be audible on the left.

The following cases, given in abstract, illustrate the foregoing statement:—

CASE I.—Philip Sheridan, aged thirty-eight, was admitted into hospital at eight o'clock, a.m., on the 20th October, in a state of collapse. He had been intemperate; and, for three weeks prior to the date of admittance, had been suffering from diarrhea, for which he received no treatment. There was no pulse at the wrist, *and the first sound of the heart only was audible* when he was admitted. Death took place two hours afterwards.

CASE II.—Catherine Fitzpatrick, aged thirty, was taken ill at five a.m. on the 15th November, with purging and vomiting, and was admitted into hospital at ten o'clock on the same morning. She was then pulseless and livid. Rallied somewhat after inhalation of nitrite of amyl, the pulse becoming perceptible for a few minutes, but soon relapsed into her former condition, and died at half-past two o'clock on the evening of the 16th. In the afternoon of the 15th it was remarked that “*the second sound of the heart was not audible anywhere, but the first sound was remarkably clear.*”

CASE III.—Timothy Flynn, aged thirty-four, was attacked with diarrhea on the morning of the 12th November. In the evening vomiting set in, and in the course of that night severe cramps in the legs and abdomen. He was admitted into hospital at a quarter-past seven a.m. on the morning of the 13th, and at half-past ten was seen by the physician on duty. He was then in a state of incipient collapse; pulse quick and very weak; tongue furred in the centre, but clean and moist at the edge; eyes sunken and areolated; face pale; surface, tongue, and breath cool; finger ends livid and slightly corru-

gated; heart's impulse not perceptible; first sound faint, but distinctly audible; *second sound not audible over apex or right base, but audible over, and in course of pulmonary artery.* No urine passed since yesterday; patient to have digitalis draughts, and to be cupped and poulticed over the loins.

Nov. 14.—Patient is weaker; no urine passed; pulse barely perceptible; first sound of heart scarcely audible, *and no second sound to be heard anywhere.* Diarrhea continues, but not vomiting. Death took place at three o'clock that evening (14th), no urine having been secreted since the 12th.

CASE IV.—Laurence Clinton, fifty-five years of age, was admitted into hospital on Monday the 26th November, at ten o'clock a.m. At four o'clock that morning he was taken ill with purging; at half-past six vomiting set in, and shortly afterwards severe cramps in the legs, thighs, and abdomen. On the evening of the 25th he took a full meal of bacon and cabbage, and to this he attributed the attack which occurred about ten hours afterwards. When visited at a quarter past eleven a.m. on the 26th he was livid; features collapsed; eyes sunken and areolated; tongue moist, coated, and cold, and the calomel shortly before given lay upon it; breath tepid; surface cold; finger-ends corrugated and livid; pulse at wrist barely perceptible, and not to be registered. Heart's action weak, *and only one sound to be heard, viz., the first.* Involuntary evacuation of bowels; no urine passed since he was attacked; ordered to have oxygen inhalations every third hour; to be dry cupped, and have mustard poultices over loins. After the first inhalation of oxygen it is noted that "the second sound was audible at intervals; but the second inhalation produced no such effect." This man died eight hours and a quarter after admittance.

CASE V.—Laurence Toole, aged thirty-six, taken ill at five a.m. October 23rd, with vomiting, purging, and cramps, and admitted on the same day at nine a.m. He was then livid in the face, but not elsewhere; was cold, and tortured with cramps; conjunctivæ deeply injected; *neither heart sound to be heard; no cardiac impulse to be felt.* This man was treated with calomel, brandy, and mustard applications; he died at half-past eleven p.m. on the day of admission, having been in hospital fourteen and a half hours, during which he took gr. 38 of calomel.

State of the Pupils and Conjunctivæ.—This has been found to vary, not only in the different stages of cholera, but likewise in the

same stage in different cases. In the stage of choleraic diarrhea the pupils are usually normal and equal; in a few instances they have been widely dilated in this stage, but these were instances in which the patients, having been exposed to the contagion, were profoundly alarmed at the appearance of the symptoms of cholera.

The following is an example:—

Denis Kelly, aged twenty-four, was attacked on the 8th September with diarrhea and sickness of stomach, and was admitted into hospital on the 10th; pulse full and quick; tongue coated; *pupils much dilated*; conjunctivæ injected; surface bathed in perspiration, and face presenting a remarkable expression of anxiety. This man, who was a labourer in the employment of the Ballast Board, lived in the same house with a family named Corrigan, of whom one (the father) died in the hospital on the 4th, and another (a girl aged seven) on the 9th September. Kelly was much alarmed at the close proximity of danger, and when himself attacked, was overwhelmed with fear. To this latter circumstance the dilatation of the pupils on admission was attributed; after a few hours the man's confidence was restored, and the pupils resumed their normal dimensions. This patient had consecutive fever and choleraic rubeola, and was discharged cured after a residence in hospital of 312 hours.

No one state of the pupil is characteristic of collapse; it is, however, in this stage either widely dilated, or contracted to a minute point. The former state (dilatation) is of much more grave significance, and is associated with more or less of coma and suppression of urine, and likewise with effusion into the cerebral ventricles, as we have found to be the case in four of our *post mortem* examinations. In the consecutive fever the pupil is generally contracted in the early stage, but in fatal cases it becomes dilated towards the close, coma and suppression of urine supervening at the same time.

We have not met with a case in which the pupils were contracted in consecutive fever, at the same time that the patient was partially comatose, as has occurred in the experience of Dr. Munro,^a nor can we subscribe the statement of Dr. Parkes^b that in consecutive fever "the pupils are generally contracted," unless it applies exclusively to the early stage.

CASE I.—John Morrow, aged forty-six, was attacked with diarrhea at eleven a.m. on the 19th October, and admitted into

^a Report on the Epidemic Visitation of Cholera in the 93rd Sutherland Highlanders in 1862.—Army Med. Reports, 1862.

^b Parkes on Cholera, page 132.

hospital at half-past nine a.m. on the 20th; he was then in collapse; no pulse at the wrist; eyes sunken and surrounded by dark areolæ; conjunctivæ injected with purple blood, and *pupils greatly dilated*; choleraic voice, and violent cramps; he rallied under treatment with large doses of calomel (gr. x., immediately, followed by gr. ii., every hour), and a draught every second hour composed of bismuth, chlorodyne, creasote, and morphia. On the 22nd (third day of illness) reaction was fully established, and the patient was passing into the consecutive fever; tongue dry; pulse 108 and full; pupils contracted. At ten o'clock he had a rigor. The head was then shaved, and a cold lotion applied, and a draught was given every second hour containing tinct. digitalis, m. x. and nit. spirit of ether m. xx. 23rd. Pulse 102 and of moderate volume; skin hot; tongue dry and crisped in the centre and at tip; *pupils dilated*; mind unaffected; diarrhea and vomiting arrested. On being questioned, the patient admitted that he had not passed water for the preceding twenty-four hours. The loins were cupped to ʒiv. , and the digitalis draughts continued. He wandered a little that evening, and somewhat later the *pupils became largely dilated*; he died comatose at two a.m. on the following morning (the 24th).

CASE II.—Stephen Curtin, a boy twelve years of age, was seized with cholera on the 6th September; admitted on the 7th at 3 a.m.; he was then pulseless, and perfectly livid; *pupils dilated*; conjunctivæ injected and eyes prominent; this boy moaned most piteously, and was remarkably restless.

CASE III.—Michael Monks, aged forty-five, attacked with vomiting and purging on the morning of October 21st. On Monday the 22nd he was admitted into hospital at one o'clock a.m. No pulse to be felt; surface cold and blue; eyes sunken, and conjunctivæ injected; secretion of urine suppressed. Treatment consisted in large doses of calomel, and warmth to surface. On the following morning (23rd) he had several epileptiform fits in rapid succession; suppression continued, and *pupils became widely dilated*; he died October 23rd, at three p.m.

Of the opposite condition (contraction) of the pupils in collapse, the following is an example:—

CASE IV.—Mary Parrot, aged seventy, taken ill with diarrhea and vomiting at 3 o'clock in the afternoon of the 12th October. Admitted at eleven a.m. on the 13th, at which hour she was visited. The surface was then cold and livid, but not remarkably so. No

pulse to be felt at the wrist. Eyes sunken, and *pupils contracted to the size of pin-holes*. Well marked arcus senilis. Respiration slow and unembarrassed; no diarrhea, vomiting, or cramps, since admittance; calomel placed on the tongue was not swallowed. To have spirit of camphor-drops every few minutes; died at half-past two p.m., that is, three and a half hours after admittance. In one instance we observed inequality of the pupils a few hours before death. In that case the conjunctivæ were ecchymosed, and the eye, in which contraction of the pupil existed, was remarkably prominent; the other pupil was natural.

In the great majority of cases of collapse, and likewise in bad cases of choleraic diarrhea, the vessels of the conjunctivæ are injected with dark purple blood. Indeed, the peculiar appearance given to the eyes by this state of the conjunctivæ, conjoined with the characteristic tongue previously described, may be regarded as pathognomonic of cholera.

Consecutive Fever.—The fever of reaction has occurred only in a limited proportion (23 in 197) of the total number of cases. The period of its accession was from the second to the tenth day of illness—most frequently about the fifth day. Its average duration has been 139 hours, and the deaths have been to the recoveries in the proportion of 9 to 14.

This fever, which is rarely if ever witnessed in a severe form except consecutively to collapse, is characterized at its access by gradual increase in the rate and strength of the pulse, elevation of surface-temperature, and crisping of the tongue, and when fully pronounced, is distinguished by rapid and sharp pulse, hot and dry skin, headache, contracted pupils, and injected conjunctivæ; dry and brown tongue, suppression of urine, and return of vomiting. In fatal cases death has been usually preceded by coma.

In eight instances a remarkable cutaneous eruption has appeared in the course of the consecutive fever. This may be regarded as peculiar to the febrile stage of cholera, and more closely resembles measles than any other eruptive disease associated with fever. Hence we would designate it as “*rubeola cholERICA*.”

The surface of the entire body, but less frequently the face than other parts, is covered with large irregular blotches of a dark or lobster-red tint, usually discrete, and separated by portions of unaltered skin. There is generally cough, congestion of throat and conjunctivæ, and weeping from the eyes. But these last-mentioned

symptoms are not of invariable occurrence, as in true measles. The rash, like that of measles, passes off by desquamation.

It generally occurs in young subjects; the ages of those affected by it, having been, with two exceptions, under 25 years. In several instances it has occurred in the reaction from collapse, and likewise in the mild consecutive fever which occurs in convalescence from choleraic diarrhea.

The average period of its appearance after first illness has been 208 hours; and the time during which it remained out 55 hours. *In no instance has death occurred in which this eruption appeared.*

It has been attributed by some writers to the free administration of calomel or of opium in the treatment. In six of our cases calomel had been given. In one of these, a case of choleraic diarrhea in which 50 grains of calomel were taken, there was slight mercurial action; but in the others, which were cases of collapse, and made good recoveries, no evidence of mercurialization was exhibited.

In two of the cases opium was given, viz., those in which no calomel has been taken, and in these cases only in very small quantities.

We cannot therefore admit that the eruption in question is the result of the constitutional action either of mercury or of opium. We regard it, on the contrary, as peculiar, though not essential to cholera; as *eliminative* in character, and as affording strong evidence of the presence of morbid matter in the blood.

Doctors Woodman and Heckford* have had three cases of this rose-rash at the Limehouse District Cholera Hospital, London. No opium had been given in these cases, and calomel only in one (probably) before admission. It appeared in raised patches, more or less distinct; there was little or no itching or smarting; it made its appearance from the sixth to the twelfth day of illness, usually subsiding in about three days, and followed by desquamation. The urine was albuminous during the continuance of the rash, and in some cases after desquamation, and under the microscope was found charged with tube-casts and epithelium.

In the *Lancet* of August 11, 1866, is reported a case of choleraic roseola in a boy 16 years of age, who was taken ill with diarrhea on the 28th July, and admitted into St. Bartholomew's Hospital on the 31st. On the 7th August, *i.e.*, ten days after first illness, the rash appeared, accompanied by much itching.

* *Lancet*, September 29, 1866.

Doctor Sutton, of the Bethnal Green Hospital,^a mentions another case of "roseola" in a child. It appeared like nettle rash on the tenth day, and on the next it resembled roseola.

Doctor F. Makenzie^b has seen six cases of roseola in cholera, in none of which opium had been given.

Doctor A. Clarke, of the London Hospital,^c also reports a case of "roseola" in a child aged six years, who was admitted in collapse. On the tenth day reaction set in, and with it "roseola" on arms, which quickly became confluent. It disappeared suddenly on the third day of eruption, and immediately violent and continuous cramps of hands and feet set in, lasting six days. Ultimate recovery.

Also a second case, viz., in a boy seven years old, not collapsed, "roseola" appeared on the tenth day of illness, and disappeared on the third day of eruption. Spasm of feet and legs set in immediately on the disappearance of the eruption, and lasted five days, when the boy died.

A case of "roseola" has been published by Dr. H. Weber,^d the eruption appearing on the tenth day after attack, arms chiefly affected, but trunk and legs also. Eruption resembled measles, but on the second day was of a more deeply scarlet tint.

In several of the cases of secondary fever we noticed a peculiar aphthous sore mouth as a very late symptom. It in no wise resembled mercurial sore mouth, and appeared in one case in which no mercury had been given. In one case, likewise, it gave rise to abscess in the substance of the soft palate, which required to be freely opened by incision.

Animal Temperature.—The observations which we have made upon this subject have yielded the following results:—

In a man aged thirty-six, dying in collapse, the temperature of the rectum five hours before death was $90\frac{2}{3}^{\circ}$ F., and in the axilla $98\frac{1}{3}^{\circ}$ F.

In a man aged twenty-four, suffering from choleraic diarrhea, the temperature, as registered on the fourth day of illness, was, rectum, $97\frac{2}{3}^{\circ}$ F.; axilla $96\frac{4}{5}^{\circ}$ F.

A boy, aged twelve, in incipient collapse, on second day of illness, and four days before death, the temperature in the rectum was $98\frac{1}{2}^{\circ}$ F.; and in the axilla 97° F. The pulse was then 102, and hardly to be felt; finger ends white and bloodless; backs of hands presenting a dusky reticulated appearance. Vomiting in *jets*; was drowsy.

^a Lancet, September 22, 1866.

^c *Ibidem* September 8, 1866.

^b Lancet.

^d *Ibidem*, August 25, 1866.

After inhalation of the nitrite of amyl the temperature in the rectum fell $1\frac{1}{3}^{\circ}$ F., whilst the pulse descended eight beats.

The foregoing results will not warrant us in subscribing the opinion of Dr. M'Kenzie^a that—"It may be stated as a general inference, from the observations made, that in proportion as the external temperature of the body is diminished, that of the internal passages (rectum, vagina, &c.) is increased."

In a few instances we have noted an elevation of surface temperature within an hour or two after death.

Incubation.—The period of incubation, by which we mean the time elapsing between the reception of the morbid poison and the first manifestation of specific symptoms, has been differently estimated. The "International Sanitary Conference" Committee state,^b that in no well established instance has it extended beyond "a few days."

Dr. Parkes estimates it at from three to four days. Drs. Adams and Welsh^c give examples which show that in their experience it has been from two to three days.

Deputy Inspector-General Barrow,^d writing of the communication of cholera from the emigrant ship "England" to the men Purcell and Terence, and through the latter to their families, at Halifax, says:—"Of these nine persons one suffered on the second day after exposure; two on the third day; three on the fourth day; two on the fifth day, and one on the sixth. It would appear, therefore, that in the greater number of these cases cholera had developed itself from the third to the fifth day after exposure."

In the case of the woman Gaffney, already detailed in this Report, as illustrating the contagious property of cholera, the period of incubation was seven days.

In the cases of Mary Hart and her baby, and that of the clergyman at Clondalkin, the period was much shorter.

Cramps and loss of voice.—Cramps are, in our opinion, due to want of arterial circulation in the muscles, whether this be the result of spasm of the vessels, viscosity of the blood, or insufficient propulsive power in the heart. We believe that failure of voice is due to want of power in expiration, conjoined with "a diminished volume of air in the lungs," as stated by Dr. Parkes. In connexion

^a Lancet, August, 1866.

^b Medical Times and Gazette, October 6, 1866.

^c *Opus citat*, page 331, *et sequent*.

^d *Opus citat*, Army Med. Report, 1867.

with this subject, a case of venous injection in cholera, recently published by Dr. L. S. Little of the London Hospital,^a possesses much interest. The case was the following:—A woman in the collapse stage of cholera, suffering from severe cramps, and with total loss of voice, was treated by alcoholic injection into the veins, to the amount of nearly ten pints; *immediately after the injection, the cramps ceased, and the voice was restored*; this patient recovered.

Treatment.—The general plan of treatment which we have pursued is sufficiently exhibited in Tables 3 and 4 A. and B. Very few remarks are therefore required here.

Creasote water, allowed *ad libitum*, and composed of m.iii. of creasote to a pint of cold water, we have found most beneficial, not only in appeasing the thirst, but likewise in allaying the irritability of the stomach.

Nitrite of Amyl.—In the year 1863 Dr. Richardson of London, reported upon, and exhibited, at the meeting of the British Association for the Advancement of Science at Newcastle, the action of this agent, administered by inhalation; and again, at the meeting of the same association at Bath in the following year, he further illustrated its action. When inhaled for a few moments, he showed that it is capable of so exciting the circulation, that the face becomes flushed, accompanied with a thrilling sensation. It occurred to us, that in virtue of this remarkable property the nitrite of amyl might be useful in re-establishing the circulation in the collapse of cholera.

In one case, that of a man forty-two years of age, admitted in incipient collapse, the pulse rose from 102 to 114, and the temperature in the axilla from $95\frac{1}{2}^{\circ}$ F. to $96\frac{3}{4}^{\circ}$ F., after inhalation of the nitrite of amyl for three minutes. The inhalation appeared to aggravate his thirst.

In another case, a woman, aged thirty-four, also in collapse, the pulse became perceptible after inhalation for a few minutes, and the patient seemed otherwise improved. Thirst seemed aggravated by the inhalation in this case also.

A boy, aged four, in collapse, inhaled the amyl for a few minutes, after which there was a slight appearance of colour in the face; the boy strenuously resisted its further administration, owing to the obstruction to free respiration which it occasioned.

In several other cases the amyl was tried; but, although when

^a Medical Press and Circular, Feb. 27, 1867.

inhaled for a few minutes it usually heightened, in some degree, the colour of the face, and surface-temperature, the difficulty of inducing the patients to continue the experiment for a sufficient length of time, owing to its interference with respiration, and the increased thirst which it occasioned, caused it to be abandoned.

Oxygen.—Inhalation of oxygen, by means of Dr. Richardson's apparatus, was also made trial of. In one case, that of a woman in collapse, the pulse became perceptible for a few minutes.

A woman, aged forty-four, in collapse, inhaled oxygen for eighteen minutes, the pulse, previously all but imperceptible, increased in strength, and the temperature of the surface was slightly elevated.

In a third case, that of a girl, aged twenty-four, oxygen was administered on three several occasions; the temperature rose slightly after the first administration, and the patient requested that she might have it again, "as it gave her relief."

The oxygen, like the amyl, though of temporary advantage, was found to produce no permanent benefit, and was therefore discontinued.

State of the Blood.—In connexion with the pathology of cholera a full and accurate knowledge of the state of the blood has been much desired, and is still wanting. We believe that not only is the blood the primary seat of the choleraic agent, but that, to the physical and chemical changes wrought in it by the operation of that agent, and the consequent depravation of its vital or nutritive properties, are due the prominent symptoms and fatal tendency of cholera.

Mr. Sedgwick denies the existence of a specific morbid poison in the blood in cholera, and refers all the phenomena of that disease to functional derangement of the centres of the sympathetic system, excited through the medium of the stomach.

No doubt the stomach is functionally deranged, but the derangement may, with as much show of reason, be referred to cerebral irritation as to sympathetic; and even more plausibly, because there is, almost invariably, engorgement of the cerebral vessels, whilst congestion of the sympathetic ganglia has not been observed in cholera. No doubt Delpech^a declares that he has found traces of inflammation in the semilunar ganglia of persons who had died of cholera; but Cruveilhier^b has not met with this or any other organic change in these bodies, or in the solar plexus emanating from them.

^a *Etudes du Cholera Morbus en Angleterre et en Ecosse.* Paris, 1882. 8vo.

^b 14^o Livraison.

In the *post mortem* examinations of cholera which we have made we have likewise failed to find congestion or other alteration of the abdominal sympathetic system.

The doctrine of “derangement of the ganglionic system of nerves,” to which vascular engorgement and arrest of secretion in cholera have been attributed, is therefore unsupported by facts; whilst the blood-doctrine has in its favour the admitted fact of chemical alterations in that fluid, which, by impairing or annihilating its nutritive affinities for the vessels and tissues through which it circulates, would account for the arrest of pulmonary and general circulation, and of glandular secretion.

Dr. Parkes^a says:—“It will be seen that the leading idea I have formed of the nature of cholera is, not only that it is primarily a disease of the blood, as has been so frequently surmised, but that the changes induced in the function of respiration, directly consequent on the alteration of the blood, are the proper and distinctive symptoms of the disease.”

“That there is some impediment or arrest of the circulation in the capillary system generally, and in the pulmonary capillaries in particular, appears almost certain; and it is by no means improbable, from the whole bearing of the facts, that this is due to a chemical change in the fibrin, and in its mode of combination, consequent on the direct agency of the active cause.”

He has found the blood, in the majority of cases, uncoagulable, and its colour dark.

The blood in the collapse stage of cholera, as is well known, is dark and viscid—the latter quality being so decided as to render it difficult to obtain even a small quantity of blood by venesection. In one instance we succeeded in obtaining an ounce and a half with great difficulty a few hours before death. In another, on making a puncture in the vein, a large drop of dark tarry blood welled up, and effectually blocked the opening, remaining fixed to the wound; no more blood could be drawn. The blood of the former patient, examined microscopically, exhibited the red corpuscles *dwarfed and crenated*.

Some blood obtained by cupping from the loins of a man in the consecutive fever, twenty-four hours before his death, showed the red corpuscles of normal size and shape, but aggregated in *rouleaux*. In one instance we tested the reaction of the blood, and

^a *Opus citat*, pages 4 and 112.

found it alkaline, contrary to the experience of Dr. Marcus at Moscow.^a

Dr. R. D. Thompson^b has analysed the blood in cholera, and found the water diminished, whilst the solids were all in excess of the normal proportion. Thus—

SYNOPSIS OF DR. THOMPSON'S EXPERIMENTS.

			In Cholera.		In Health (Lecanu.)
Water ...	...	...	717·8	...	790·00
Fibrin ...	..	...	4·5	...	2·95
Globules and albumen		...	268·8	...	199·55
Insoluble salts	...	...	1·8	...	1·00
Soluble salts ...	...	...	7·1	...	6·50
			1000·0		1000·00

Schmidt^c has found a deficiency of water, salts and fibrin, and has observed the loss of these constituents of the blood by transudation into the alimentary canal, to occur in the order in which they have been just mentioned. He likewise found the blood corpuscles considerably altered, both physically and chemically, mainly by loss of water and chloride of potassium, and a reduction, by one-half, of the amount of oxygen normally contained in them.

Pathology.—The *post mortem* appearances in the bodies examined by us (four in number), were nearly identical with those observed by Parkes^d and Munro,^e and likewise described and illustrated by Cruveilhier^f and Craigie.^g

The autopsies were made from five to six hours after death. The *rigor mortis* was absent, and the bodies were much less livid than in the last hours of life.

Cranium.—The sinuses of the dura mater and the cerebral veins were engorged with dark blood. The pia mater investing the brain generally, but more especially at the base, was congested. The choroid plexus was remarkably congested, and of a slate colour.

On making a horizontal section of the cerebral hemispheres the

^a Aitken's Science and Practice of Medicine, Vol. i., p. 634.

^b Chemical Researches on the Nature and Cause of Cholera, Medico-Chirurg. Transactions, Vol. xxxiii.

^c Aitken's Science and Practice of Medicine, Vol. i., p. 632.

^d *Opus citat.*

^e *Opus citat.*

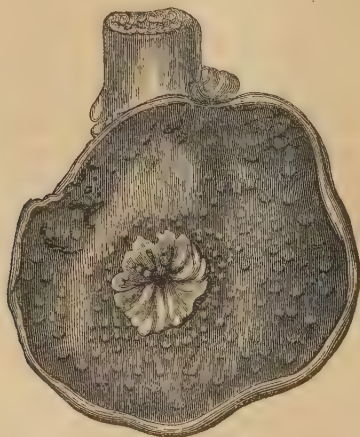
^f *Opus citat.* Pl. 1, 2, 3, 4, and 5.

^g Edinburgh Med. Journal, Vol. xxxix.

puncta cruenta were observed to be large and numerous, and from each welled up dark liquid blood, which, in a few seconds, formed a patch of ecchymosis. The cerebral ventricles contained a good deal of clear serum—in one instance they were distended with it. The membranes of the upper portion of the spinal cord were similarly congested, but its white substance and grey centre were free from vascularity.

Thorax.—The lungs were somewhat congested posteriorly, but still resonant on percussion, and crepitant. In the infero-posterior portion of one lung there was much dark blood, mixed with serum. The anterior portions of the lungs were of a light colour, and free from congestion. The right cavities of the heart were full of dark, tar-like blood, which, in the right ventricle, was enveloped in a capsule of fibrin one-eighth of an inch thick, and extending into the pulmonary artery. The left chambers were empty and contracted; the left ventricle much diminished in capacity, firm and thickened, manifestly by strong contraction of its walls.

Abdomen.—The peritoneal surface of the hollow viscera was smooth, white, and glistening, as in a state of health. Liver, spleen, and kidneys normal. Mesenteric glands all more or less enlarged—some of the size of peas. The semilunar ganglia, solar plexus, and splanchnic nerves presented a natural appearance, and were free from congestion. The stomach contained a quantity of gruel-like fluid. The mucous lining of the œsophagus projected into the stomach, forming a radiated disc, with a festooned border of a pale colour, and sodden-looking, and presenting the appearance of a piece of wet parchment (Fig. 1). In the immediate neigh-



bourhood of the cardiac orifice the mucous membrane of the stomach was remarkably mammillated, the crypts being distended with an opaque white liquid (Fig. 1). Both the small and large

Fig 2.



Fig 3.



intestine were nearly filled with a liquid of the colour and consistence of thin boiled starch, in which small white flakes were suspended. Brunner's glands were enlarged, and of a light colour. In the jejunum and ileum the glands, both solitary and agminate, were enlarged and filled to distension with an opaque fluid resembling unhealthy pus (Figs. 2 and 3). The mucous surface generally was vascular in the jejunum and upper portion of the ileum. The lower portion of the ileum was free from vascularity; the solitary glands were here remarkably distinct, and one of Peyer's patches was found to have discharged its contents, all its glandules being ruptured and collapsed, and each presenting a distinct aperture on the surface, by which the contents had escaped (Fig. 2). The entire surface of this patch, which measured about three inches in length, was depressed below, and contrasted markedly with the surrounding surface, on which the solitary glands were prominent and distended (Fig. 2). The liquid contents of one of these glandules, examined microscopically, were found to contain large granule cells like mucous-corpuscles, and amorphous granular matter. The enlarged solitary glands extended quite to the ileo-cecal valve. In the ascending colon some slight vascularity was apparent. The above description applies in all essential particulars to the three bodies in which the stomach and intestinal canal were carefully examined; the correspondence in regard to the state of the intestinal glands in these three bodies being especially remarkable.

The larynx of a woman who was admitted in collapse, with total loss of voice, and died, two hours afterwards was examined, the true vocal chords were thickened, their sharp angles rounded off, and the ventricles of the larynx diminished in capacity by thickening of the mucous membrane. There was, however, no abnormal vascularity.

The state of the intestinal glands demand special observation; Dr. Parkes, who, in his work on cholera, notices this state, regards it as a consequence of the diarrhea. We cannot coincide in this opinion, being aware that in other diseases complicated with intestinal lesion, diarrhea is a frequent consequence, though rarely if ever a cause of glandular enlargement. Moreover, in the neighbourhood of these glands there was no appearance of irritation or abnormal vascularity, such as Dr. Parkes' view of the pathology of their enlargement would necessarily imply. Our firm conviction is, that the engagement of these organs, their distention with a fluid of an apparently specific character, and subsequent discharge of it by rupture of their walls, as exemplified

in a few of the patches of Peyer, is, like the diarrhea, *eliminative* in character and purpose, and to be regarded as evidence of the presence of a specific morbid poison in the blood. Further evidence of this is furnished, as we believe, by the peculiar roseolar eruption previously noticed under the name of *rubeola cholERICA*.

We are indebted to Mr. Oldham, of Rathgar, for the beautiful woodcuts annexed, which he has engraved from the original drawings of the late Mr. Connolly, whose recent death inflicts a loss upon the medical profession in Dublin which it will not be easy to repair.

It is our firm conviction that cholera, although when advanced to the stage of collapse, an appallingly fatal disease, is, nevertheless, *preventible* in the strictest sense; and *eminently curable* in the stages preceding collapse. Of the truth of the latter assertion a direct confirmation will be found in Table 3 A of this report.

As regards preventibility, very important evidence has been recently furnished by the Registrar-General of England, showing the effect upon the mortality of cholera, of well-devised and well-executed sanitary measures. It appears from his returns, that the death-rates per 10,000 of the population in England and Wales, during the three last epidemics, have been as follows, viz.:—

1849	.	.	.	62
1854	.	.	.	43
1866	.	.	.	18
Per 10,000 of population.				

M. Dumas^a stated at a recent meeting of the Academy of Sciences, Paris, that during the cholera-epidemic of 1865, not one of the women employed in washing the linen of the Paris hospitals (*which was always, in cholera cases, disinfected as soon as brought from the wards*), fell a victim to cholera. Moreover, only one of the employés of the *Administration des Pompes Funèbres*, amounting to nearly 1,100 persons, died from cholera; *the Administration having rigidly insisted on the observance of the requisite hygienic precautions.*

Dr. W. Budd, in a carefully compiled and able report on the recent epidemic of cholera at Bristol, illustrated by maps, shows, in a striking manner, the efficacy of sanitary measures and prompt disinfection. He says:—"A comparison of the numbers swept off by

^a Medical Times and Gazette, Feb., 1867.

cholera and diarrhea in Bristol (including Bedminster and Clifton, which, with Bristol, are practically but one town) in the four successive outbreaks of 1832, 1849, 1854, and 1866, will be the best introduction to what is to follow. These numbers are, respectively, 1832, 626; 1849, 1,979; 1854, 430; 1866, 29. From these figures it will be seen that the deaths which, from something below a thousand in 1832, had risen to nearly 2,000 in 1849, fell to 430 in 1854. This great drop, in exact accordance as it was with the corresponding abatement of the mortality from the pest in other cities, was at the time, and no doubt rightly, ascribed to the sanitary improvements which had taken place in the city in the interval between the two epidemics, and especially to the construction of a better system of sewers, and the introduction of a pure supply of water."

"But the fall from 1854 to 1866 is much more remarkable. For while the deaths in 1854 amounted to about one-fifth of those of 1849, the deaths of 1866 were one-fifteenth only of those of the former year. Part of this result might, no doubt, be reasonably ascribed to progressive sanitary improvement, but the very abruptness of the contrast between the mortality of the two years naturally suggests to the mind the intervention of some new controlling condition."

"As a matter of fact such a condition did exist in the shape of the vigorous employment of the disinfecting plan. An analysis of the facts will leave no doubt, I think, in any reasonable mind, of the reality, while it alone can give an exact measure of the extent of the operation of this plan in preventing the spread of the disease."

Doctor Mapother, in his recent work on Public Health,^a declares that "he is convinced, from a comparison of the last with the previous epidemics, that cholera will be a more frequent visitor, and our safety lies in sanitary work, which will, with positive certainty, render its attacks less formidable."

In this statement we quite concur; and we feel satisfied that if the air breathed, the water drunk, and the food taken, be of a wholesome character, individuals and communities so circumstanced will suffer comparatively little from cholera epidemics.

Of the air and the water consumed by a population, the public authorities of the place are the legitimate and responsible custodians, and no remissness of action in regard to these essentials to public

^a *Opul. citat.*, Feb., 1867, page 453.

health should be permitted upon their part. They are now armed with sufficient power, under the law, to enforce the observance of sanitary precautions, not only in thoroughfares, but likewise in private residences, and if they do not use them to good purpose, they should be held to strict account by those whose interests are thus intrusted to their care.

Every enlightened man in a community, as it seems to us (and more especially, every physician, who understands this question in all its bearings), should be a *sanitary public officer*, to the extent of co-operating, to the utmost of his power, with the persons deputed by law to supervise the public health.

It is notorious that in the successive epidemics of cholera, the disease has visited and desolated the same streets, and the same houses, where, in the intervals, sanitary improvements have been neglected.

The address of every house in this city in which a case of cholera occurred during the recent epidemic, and a record of the number of cases in each house, is in the possession of the dispensary and hospital physicians who had charge of these cases.

We would venture to suggest that this mass of local information be utilised for the construction of a system of house-to-house visitation, which, we believe, if fully and conscientiously carried out, would effect the utmost that is possible towards the prevention of cholera in the future.

In conclusion, we beg to subjoin a brief summary of the principal conclusions which we think are fairly deducible from the foregoing report:—

1. The diarrhea so prevalent amongst the inhabitants of localities actually suffering from cholera, is a premonition, and the earliest manifestation of cholera.

2. Cholera is a disease strictly preventible by sanitary and hygienic measures, and, in nearly all cases, curable in the stages preceding actual collapse.

3. The treatment which we have found most successful in the stage of choleraic diarrhea is sulphuric acid and opium; with sinapisms, external heat, and creasote water.

4. In collapse we have had more success with calomel given in large doses, than with any other medicinal agent. In several cases, besides those in which recovery took place, reaction set in under the calomel treatment, but death occurred in the consecutive fever.

5. We believe cholera to be contagious, but in a much less degree than the principal endemic contagious diseases of this country, viz., typhus, scarlatina, measles, and small-pox.

6. As regards individuals exposed to the contagion of cholera, a state of good health, with sanitary and dietetic precautions, afford a strong assurance of immunity from attack.

7. *Immediate* attention should be given to derangement of stomach, or laxity of bowels, during a cholera epidemic; and to insure this amongst the poor, house-to-house visitation seems indispensable.

ART XXII.—*Cases of Fever, with Cerebro-spinal Meningitis, with Remarks.* By SAMUEL GORDON, M.B., Fellow and Censor of the College of Physicians; Physician to the Richmond, Whitworth, and Hardwicke Hospitals; Lecturer on the Practice of Medicine, Carmichael School of Medicine, &c.

SINCE the year 1846, when the late Dr. Mayne published in this Journal his "Remarks upon Cerebro-spinal Arachnitis," and Dr. Darby "submitted his detailed account" of the same disease to the Surgical Society, we have seldom been for any long time without witnessing sporadic cases of that formidable affection in this city, either in hospital practice or in private.

It sometimes occurred as the primary disease, at other times it came on as sequela of typhus, or of the exanthematous fevers. In the late epidemic of cholera it often attacked convalescent patients, four such were simultaneously attacked with it in the Hardwicke Hospital; and while it usually presented many formidable symptoms which rendered the diagnosis sufficiently plain, medical treatment early adopted and energetically followed up saved the lives of many. Within the last year the same disease has again assumed the character of an epidemic, and by the rapidity of its progress in many cases, and the obscurity of its symptoms, has caused great alarm; the occurrence of some new phenomena may, perhaps, render it advisable to record a few of the more recent cases.

Amongst the first which I believe occurred in this city of the epidemic, in what I will term its new form, was the following, admitted into one of my wards in the Hardwicke Hospital, on April 5, 1866; and, contrary to what usually happens in the earliest cases

of a new formidable epidemic, the patient recovered. Bridget Fox, aged eighteen, was attacked, on the 2nd April, with severe pain in her head and back, and pains in all her bones, with shivering. She remained in bed all the 3rd, but could not get warm. On the 4th the pains were so great that she could not move. She vomited frequently thin greenish matter, and was also frequently purged. On the 3rd she observed some blue spots coming out on her legs, which gradually increased in size, and when she came into hospital both the upper extremities and the right lower extremity were thickly covered with dark blue spots—some small, others very large.

In some the cuticle was raised, and very dark serum effused beneath it. Some consisted evidently of large extravasations of blood, as seen in purpura, while others were distinctly effusions into the cuticle, and so raised prominently above the surface. Besides these the entire body was extensively covered with large ecchymosed spots, like bruises. The constitutional symptoms were very severe—alternating delirium and coma, slow respiration, quick pulse, temperature 103; great soreness of the surface in general, with severe pains on motion. This girl blamed for her illness the emanations from an open cess-pool near the house where she lived. She made a good recovery, but many of the spots passed into superficial gangrene, and healed with loss of substance; in the remainder the effused blood was gradually absorbed, but discoloration was long observable, and there still (April 5, 1867) exist deep depressions where the gangrenous action had existed.

This case is not selected as a notable example of the epidemic, but because it was the first which came under my own cognizance of the combination of the peculiar eruption with symptoms of cerebro-spinal irritation.

CASE II.—W. J. S., ten and a half years of age, a pupil in a large public school, appeared to be in perfect health on the morning of the 3rd of March. He took his usual part in singing in the choir in church, but was observed to be unusually drowsy. After church he walked into the play ground, but complained of cold and weakness, and on passing into the dining-hall he vomited; he then (it was now two o'clock) walked up between two other boys into the infirmary. He was now cold and shivering; the infirmary nurse said he had the look and smell of death on him. He was rapidly undressed, and put into a hot bed, and external heat and counter-irritation largely applied. In about twenty minutes re-animation was

partly restored; he now complained of intense pain in the head, vomited black, coffee-coloured fluid, and afterwards some yellow bilious matter. The apothecary of the institution saw him about half-past two o'clock; a turpentine enema was administered, and he had some cordial diffusible stimulant, and the external heat and counter-irritation were kept up. I saw him about five o'clock, he was then rapidly becoming comatose; his pupils were slightly dilated, insensible to light; he was quite deaf; the temperature of the body was rapidly failing. He was bedewed with cold, clammy perspiration; his body, more particularly the lower extremities, was covered with a dark purplish eruption, which the nurse said rapidly came out on him after he was put to bed. This eruption consisted of spots of various sizes and shapes. He had no muscular rigidity of any part of the body. His bowels had been moved, and he had passed urine, both unconsciously. His respiration was nine in the minute; his pulse 120; he had not spoken since he came into the infirmary except to complain of his head. I directed his head to be shaved, strong counter irritation to be applied to the scalp and upper part of the spine; the diffusible stimuli to be continued. He gradually passed into a state of complete somnolence, and he was dead at a quarter past six o'clock.

The entire duration of his illness was under five hours. An accurate *post mortem* examination of the entire body was made. The arachnoid membrane over the upper surface of the brain was all more or less opaque, and in some spots presented a greenish hue, which was owing to the existence of a layer of very thin purulent matter beneath it. This condition existed chiefly over the lateral portions and along the top of the fissures; there was some turbid serum in the ventricles, and a large quantity at the base of the brain also discoloured. Cerebral pia mater was excessively vascular, and this condition extended also along the entire spinal cord. The arachnoid membrane at the base of the brain was comparatively healthy. The blood was everywhere very fluid; the right side of the heart was gorged, and the lungs remarkably congested.

The mode of this patient's death throws great light upon the nature of the disease—he evidently died asphyxiated—the respiration had rapidly come down to nine in the minute, while the pulse was 120. The large quantity of serum which was rapidly effused into the upper part of the spinal canal, had produced mechanically a direct paralysis of the muscles of respiration, and the profound and fatal coma was induced partly by the mechanical pressure

on the great nervous centres, but still more so by the depressing influence of the unaerated and highly carbonized blood, which was circulating through the brain. The diseased condition of the blood must not be overlooked ; it formed an important element in the case, giving rise by its remarkable fluidity to the cutaneous eruption, and to the congestions which were everywhere manifest.

CASE III.—E. C., aged fifteen, a pupil in the same school, came to the infirmary on the morning of March 11, complaining of severe pains in his hips and groins ; his pulse was natural—his respiration quiet—his bowels free—urine copious—no pain on pressure along the spine nor over the seat of pain. He was ordered to remain in bed, to have some diaphoretic mixture, and a warm hip bath in the evening. He took but little food throughout the day ; but had no rigor nor other accession of illness. He woke suddenly in the middle of the night, delirious, began to hum tunes, to fancy that different people were conversing with him, and continued for hours in a more or less excited state ; towards morning he vomited, had slight diarrhea, and then became quiet, but gradually became listless and stupid. I saw him very early in the morning ; he swallowed very freely, but showed scarcely any other sign of intelligence ; his pupils were fixed, insensible to light, and he had slight strabismus ; he had no rigidity of any part of the body, nor did he evince any sign of pain on pressure ; he passed urine and feces involuntarily ; some few spots like stains, or the *taches bleautres* seen in typhus fever, came out over the surface of the body, particularly over the lower part of the chest and the abdomen ; his pulse was 120, very small ; his breathing slow and oppressed ; the surface of the body could, with difficulty, be kept warm. All possible means were used to recover him from this collapsing state. I had the advantage of Professor Banks' and Dr. Croker's assistance, and he continued to live until midnight. *Post mortem* examination fifteen hours after death found some serum at the base of the brain. The arachnoid membrane on its surface was slightly opaque in spots, and there was some subarachnoid effusion of discoloured serum, but no lymph or purulent matter ; there was effusion into the ventricles of the same nature, with excessive vascularity of the choroid plexus, and of the entire pia mater, both cerebral and spinal.

The right side of the heart was gorged with blood, the lungs excessively congested ; the blood everywhere remarkably fluid.

It may be considered that in this case the *post mortem* appear-

ances were insufficient to account for death, or to connect the death with cerebro-spinal disease as cause and effect; but, firstly, it is to be remembered that many of what are termed blood diseases cause death before their specific characteristics have time to become developed; we often find it so in an analogous disease—typhus fever; and such is well known to be the case in cholera. When the cholera reached Muscat (says Dr. Williams), in some instances only ten minutes elapsed from the first seizure before life was extinct, long before any characteristic morbid appearance could be developed, at least in the solid organs of the body.

There was, perhaps, some difference in the mode of death in the two cases. The first was clearly asphyxiated, the second died from the shock of the disease, and from the rapid supervention of cerebro-spinal congestion. We cannot ascertain what amount of effusion or congestion is sufficient to produce symptoms of compression; this will depend on the rapidity with which such effusion is poured out, and the resistance which the nervous centres are capable of making, rather than on the quantity of the fluid. But in these two cases we had, for a few hours, symptoms of a profound nervous prostration, with obvious marks of blood disease; the latter continued after death, and the former are shown to have co-existed with an effusion of discoloured serum into and beneath the arachnoid membrane in one case, and with other marks of incipient disease of the same part in the other.

Cases II. and III. are examples of this malignant epidemic proving fatal in the very early stage, before any organic affection of the nervous centres had time to be fully developed. Case II. is, I believe, the most rapidly fatal on record.

The following case is a peculiarly well-marked example of the epidemic cerebro-spinal meningitis, in which a purulent membranous inflammation co-existed with evidences of extensive blood disease.

CASE IV.—Catherine Murphy, aged fifteen, of no occupation, residing in Corn Market, was admitted into the Hardwicke Hospital on the 26th of February. She gave the following account of her illness:—On the 23rd she did not feel quite herself, and thought she was about to menstruate, which she had not done for two months. In the evening, three spots, like hives, appeared on her forehead. On the following day, Sunday, she also felt ill, but not so much so as to prevent her being up. At about six o'clock in the evening she shivered, and soon afterwards went to chapel, where,

while kneeling, she fainted. She was afterwards able to walk home, very much frightened, and went to bed. At about two o'clock a.m., she vomited, and was very restless the whole night; did not sleep at all, and felt sore in all her bones. On the 25th the pains in the extremities increased, and she felt very weak; did not sleep at night, and on Tuesday morning felt very much worse. Then, for the first time, her friends perceived that there were dark spots on her limbs. She came to hospital on Tuesday evening at half-past five o'clock.

On admission she could answer questions distinctly, and gave a tolerably intelligible account of her illness; however, her manner was strange, and when left to herself, she wandered. On her extremities there were numerous spots of different sizes, generally about a quarter of an inch in diameter; on her knees there were some larger, and on the back of her left shoulder was one irregular blotch measuring an inch across. Their colour was a brownish red, in the centre there being a whitish spot, and around each blotch there was a rim of lighter red; both the whitish central part and the red areola followed pretty accurately the same outline as the dusky part. They were all raised above the skin so as to feel like a weal. She lay on her chest and abdomen, and refused to lie on her back; but her head was not retracted, nor did she complain of pain on pressure along the spine. She attributed the "stiffness" of her back to the fact of her "lying for two days." She said the only discomfort she suffered was a pain in the head and a soreness of her bones. Tongue white. Pulse ninety, not very weak.

27th.—Has not slept since her admission. She talked incessantly all night, extremely restless, could scarcely be kept in bed. She lay on her abdomen, and refused to allow herself to be moved on her back, or on either side. Her spine presented a most wonderful and uniform curve concave backwards; her head was now also curved backwards on the spine of the neck. I never saw so much opisthotonos in the worst case of tetanus. She had no pain or tenderness on pressure on any point of the spine.

The form of her delirium was very peculiar; she would answer any questions most accurately, however long the answer required might be; but the moment she was left to herself, she at once began to wander, and to talk the most unconnected and foolish sentences, and to imagine that various friends were around her, and speaking to her.

28th.—Head not much retracted; dysphagia very well marked;

in a much greater degree than can be accounted for by her very abnormal position; intense vascularity of the conjunctivæ; peering expression of eyes, pupils fixed, semidilated; headache gone; pains down the limbs continue; she talks incessantly, but quite unconnectedly; not so easy to make her answer questions. P. 104. Temp. 99. Tongue cleaner.

Towards evening she became very much flushed, and perspired profusely. Some fresh spots, black as ink, appeared on her elbows and feet; a mixed eruption—a few spots of bullæ, which rapidly became opaque and dusky, several patches of herpes, which rapidly became flattened and dark coloured—one or two of the original dark coloured spots near the knees are rapidly passing into gangrene.

March 1st.—Pulse 140; she is gradually lapsing into a state of unconsciousness, taking no notice of questions, but keeping up a low muttering delirium; herpetic eruption on lower extremities increased; she died at one o'clock a.m. on the 2nd.

The body, after death, presented a very frightful appearance. It was still prominently arched forward. It was of a dusky blue colour, and with a copious eruption of black spots, of various sizes, from that of a small pea to a crown piece; some small and circular, others large and irregular in form. One or two of those near the knee had taken on a gangrenous action, and appeared to have been rapidly spreading; several of the smaller spots were effusions into the layers of the skin, very prominent, hard, black, and circumscribed, like the minute spots of apoplexy in the lung. There were, moreover, various patches of herpetic eruption on different parts of the body, and several bullæ containing dark coloured serum. The brain and spinal cord presented all the appearances of intense purulent arachnitis. When an opening was made into the lower part of the theca vertebralis, purulent matter flowed out; and on slitting it up, and allowing all the fluid pus to escape, the entire surface of the pia mater, anteriorly and posteriorly, was covered with a coating of thin purulent matter, which, like a thin layer of butter, remained adherent to it. When this was wiped off, the vessels of the pia mater were found gorged with blood. These appearances extended up along the entire spinal membranes; the extreme vascularity of the pia mater was continuous over the brain, but not so the purulent effusion, which existed in patches only over the convex surface of the brain, and was not continuous. The cerebral arachnoid was all opaque, and the lateral ventricles contained an undue

quantity of turbid serum. The blood in all the cavities was very fluid and dark-coloured ; the lungs were immensely congested.

The following case is an example of the disease assuming a somewhat chronic form, and remarkable also for the complications which arose during its progress—paralysis affecting various parts ; peculiar form of ocular disease, and inflammation of the knee-joint.

CASE V.—Owen Dermody, aged twenty-one, a grocer's assistant, was admitted into the Hardwicke Hospital, March 3rd, 1867, complaining of intense headache and weakness. About eight o'clock p.m. on the previous evening, while attending in the shop, he complained of being cold and chilly, but continued at his work till 11.30 p.m. While in bed, at about two o'clock p.m., he suddenly got very ill and became quite confused in his mind. In the morning his medical attendant advised him to be removed to hospital, and he was admitted at 12.30 p.m. He was then in a very prostrate condition, his face very pale, an eruption of herpes on his nose, pulse weak and quick, tongue dirty, cannot look at the light, abdomen soft, bowels confined.

4th.—Slept badly last night; vomited frequently yesterday a yellowish fluid ; headache still continues.

5th.—Headache not much relieved ; raved during the night ; herpetic eruption on the nose and upper lip, and still spreading. The patient is constantly wanting to get out of bed. Pulse very weak.

6th.—Rather violent last night, and got out of bed several times. To-day a peculiar eruption appears, of several blueish-black spots, irregular in shape, on the chest, abdomen, neck, arms, legs, and feet. Two spots, one on the dorsum of each foot, are particularly remarkable for their size and colour. The right eye is a little inflamed with a slight discharge from it. The herpetic eruption is over his nose and lips, but has a horrible appearance, being perfectly flat, and becoming black.

7th.—Patient's head is drawn backwards toward the right side ; he has great pain in the neck with general hyperesthesia. The eruption has increased since yesterday. His mind is getting more confused.

8th.—He is quite powerless, cannot raise his arms or legs ; when spoken to, he answers questions perfectly ; but when left to himself, he talks incoherently. The lower third of the cornea is ulcerated, with great vascularity of the conjunctiva. A large bulla has

formed on the instep of the left foot. The urine is drawn off with a catheter.

9th.—The patient has not slept since six o'clock yesterday evening; he seems to suffer great pain. There is a discharge from the right eye. The lower half of the cornea is quite opaque, the conjunctiva very vascular, the iris discoloured, and the pupil irregular.

At the commencement of the attack this man got a small quantity of wine, and external heat was sedulously kept up; immediately he had recovered from the collapse, he was leeches behind the ears, his head was shaved, and cold applied; and he had large doses of chlorate of potass and muriate of quina. His head was now blistered, mercurial ointment rubbed in, and he was ordered a grain of extract of balladonna, and three grains of sulphate of quina every second hour, and the wine was resumed in small quantity.

10th.—The patient has not slept since the 8th, nor has he any appearance of sleepiness; pulse 120; pupils dilated; intelligence less clear; tongue red and dry; subsultus and general tremors; bowels confined; the eruption has faded a good deal; two more large bullæ on the right foot. To have a pill every three hours, a blister to the back of the neck, and afterwards mercurial ointment.

11th.—Pulse 136. Patient has not slept yet; he is greatly reduced; the subsultus still continues, to which is added floccitatio; increased vascularity of conjunctivæ; no improvement in the condition of the right eye; spots fading; still the lips have a better colour; continue pills and wine.

12th.—At nine o'clock last night the patient passed a large, dark-green motion from his bowels; urine scanty. About this time he began to vomit a greenish fluid, which he continued to do during the night in small quantity. He is greatly troubled with hiccough. The pupils are widely dilated. He has not slept since the evening of the 8th, and is very much exhausted. He was now given ten drops of tincture of opium, with one teaspoonful of brandy in one tablespoonful of iced water every hour. He also got 3ss. of tr. opii in an injection, which was followed by a motion from his bowels in fifteen minutes. Pulse 140. At 10.30 p.m., -when he had altogether taken about two drachms of laudanum, the vomiting stopped, and he gradually fell asleep. He slept all through the night. The pupils contracted under the influence of the opium. Head drawn backwards to right side.

13th.—Looks much better; pulse 120; tongue red, its sides covered with aphthæ. Intelligence better; can draw up his legs in

bed; seems to have most power of left side; right side of face paralysed of motion. He takes a drachm of tincture of quina, a drachm of solution of bismuth, with one teaspoonful of brandy every three hours; a weak solution of liquor ammoniæ acetatis was kept applied to the right eye; catheter still required. Four o'clock p.m.—Asleep, and slept all through the day. Head drawn to the right.

14th.—Pulse 120; temperature in axilla $97\frac{2}{3}$; tongue rough and very red; intelligence much better; passes urine. Evening, Temperature $100\frac{1}{3}$.

15th.—Pulse 112; temperature in axilla $99\frac{2}{3}$; tongue moist and clean. He seems much better to-day. His head is quite straight, and he has more power in his limbs. The urine contains a large amount of phosphates. Drinks well; eat two small biscuits last night and again this morning. Eruption gone. There is a purple tinge down the outside of his arms. Eye better. Low diet—arrow root, wine 8 oz., brandy 4 oz.

16th.—Pulse 112; urine clear; normal in quantity; appetite improving. Temperature [rose and fell several times during the day.

17th.—Pulse 120; tongue moist and clean; patient complains this morning of an intense pain in the right knee, which attacked him suddenly. The eye is much better; pupil natural. Appetite good. Bowels moved once this morning, is passing plenty of urine. His back is inclined to strip. There is immense effusion into the right knee-joint, but no redness. Heart perfectly healthy. Large opiate poultices to knee.

18th.—Pulse 100. The patient slept very well last night, and is much better this morning; he does not complain of any pain except when the knee is moved. Tongue clean; appetite good. Urine sp. gr. 1020; no albumen. The conjunctiva of the right eye is still vascular, and the cornea ulcerated. Vesicating collodion to be applied to the knee.

19th.—Pulse 112. The knee is not so tense, and is much less painful on motion. Expression of face heavy; does not answer questions so readily. Paralysis of the muscles of the right side of the face continues. Cannot move his head freely. To have bark-mixture with iodide of potassium.

20th.—Pulse 112; the patient complains only of pain in the right knee. Eye much better. Facial paralysis very slight.

21st.—Tongue clean; appetite very good; sleeps well; back which was a little stript, is almost well.

22nd.—The patient, after sleeping for some time, awoke complaining of headache, and in a short time his nose began to bleed a little, the blood coming from the left nostril. This relieved the headache.

23rd.—Patient improving every day. Does not complain of any pain. Appetite good. Tongue clean. He has steadily continued the bark mixture. Wine and light nutriment.

24th.—Pulse 112. The knee does not give the patient any pain except when he attempts to move. His neck and back are still stiff, he cannot move his head freely from side to side. Heart perfectly healthy, and respiratory murmur over chest healthy. Eye much better.

This man recovered from all the acute symptoms, but has gradually passed into a state of almost organic life; he eats, drinks, and sleeps well; he passes solid feces and urine without giving any notice, yet, evidently, not unconsciously; he is excessively emaciated, and there is a peculiar mouse-like smell from him; he seems to understand what is said to him, but he cannot answer; he never calls for anything; his breathing is rather slow; his pulse, 120; his heart acting with a peculiar strong jerking motion; his eye is quite well, as also his knee; he can draw his legs and arms up to him; but he cannot use his hands at all. Such is his condition to-day, April 29.

The above cases I have detailed as typical of the various forms in which the disease has presented itself. I could add many more. Thirty cases, at least, of this disease have been admitted into the Hardwicke hospital since April, 1866, and I have seen others in private practice.

Without detailing these at length I shall make use of them to exemplify the following remarks on this formidable epidemic.

The first question to be considered is whether the present is a new epidemic, requiring a new name, or whether it has been already described. If the latter be the case, those who have precipitately attached to it a pseudonym, calculated equally to alarm the public and misguide the profession, have, at least, acted with imprudence; but, as is well observed by an American author,^a writing on this very subject, “it is worthy of remark that whenever a malady assumes any unusual form or presents anomalous symptoms, there is always too ready a disposition to accept the novelty of it. It is

^a See Dr. Baltzell on Epidemic Typhus.—*American Journal of Medical Science*, October, 1865.

always an easier task to describe a disease than to analyse its symptoms; and the ready acceptance of a new medical theory involves less trouble, if not quite so much satisfaction, as the proof of it."

There appears to me to be no occasion to look upon it as a new disease. It was unfortunately too well known in other countries, and is well described by French, German, and American authors, who have all had vast experience of it. The cases of cerebro-spinal meningitis, which have been seen during the present epidemic may be subdivided as follows:—

1st. Cases which were characterized by the suddenness and gravity of the symptoms: usually more or less lesions of innervation and extensive dark-coloured eruption, accompanied by copious sub-arachnoid effusion, cerebral and spinal, and of various kinds.

2nd. Cases almost, or altogether, as grave, indicated by very much the same set of symptoms, in which scarce any cerebral or spinal effusion was found, but always great congestion.

3rd. Cases analogous to those of cerebro-spinal meningitis sporadically met with where the symptoms of spinal irritation were well marked, and where lymph, or pus, or both were more or less copiously effused.

In some cases as IV. and V., a copious eruption was developed; in others, as in No. III., while there was no well-marked eruption there were other distinct evidences of decomposition of the blood and of disease of the nervous centres.

But all these varieties had, in common, some symptoms of the sudden invasion of a morbid poison, which had for its two great characteristics a diseased condition of the blood and a profound nervous lesion. We are thus led to conclude that the disease is an adynamic typhus, the result of a specific poison, having a peculiar affinity for the cerebro-spinal system. Why it should have this peculiar affinity we are not yet in a position to explain, any more than we account for why the poison of enteric fever should expend itself on the glands of the small intestines.

The fact that in those patients who survive the stage of invasion an inflammation of the spinal membranes is developed, proves that the essential nature of this epidemic consists in a cerebro-spinal affection, but the diseased condition of the blood, which always exists, attests the low type of that affection, in the same way that the congestive pneumonias, and other visceral congestions, are, more

or less, a part of our ordinary maculated typhus fevers, and not to be considered in the light of independent diseases.

There are some peculiar symptoms characterizing the present epidemic which seem to require a more extended notice :—

First.—The suddenness of the invasion of the illness; or, if the attack has been some time coming on, the suddenness with which the symptoms of collapse set in; and the fact that more or less collapse, in the early stages of the disease, usually occurs. This seems to have been the case in the epidemic of 1846 also. Dr. Mayne observed that in the majority of cases the patient was in his ordinary health and spirits up to the very moment of the seizure, and experienced no premonitory symptoms to warn him of his danger; but in that epidemic few, if any, died in the state of collapse. After the lapse of a few hours, reaction, more or less perfect, ensued in all.

Second.—The almost universal occurrence of herpes in some part of the body, chiefly on the nose or on the lips.

In the accounts of this epidemic, both in France and Germany, this symptom has been much dwelt on. In a monograph, just published by Mannkopff, of Berlin, he dwells particularly on it, and adduces various reasons to prove that it is a herpes zoster, of the neural essence of which, he says, there can be no possible doubt. In almost all the cases which I witnessed, herpes was present. The nose and lips were the most frequent seat of it, but it occurred also on the shoulders, on the foot (case No. 4), on the thigh (case No. 5), on the trunk. The group of vesicles, which were usually from six to twelve in number, assumed a tolerably circular form. From the commencement the contents of the vesicles were opaque; they flattened rapidly, and became confluent; sometimes assumed a black colour (case No. IV); if the patient lived long enough (case No. 5), they died off, and left no mark. Mannkopff dwells at great length upon the occurrence of this exanthem, and quotes largely from German and Swedish physicians, as to the various regions in which it was found, and the period of its development. I observed it usually early in the disease, but in some cases it appeared late, and came out in successive crops. It appeared on the foot in case No. 4, on the day before she died.

Thirdly.—The peculiar condition of the skin, which was not observed in the former epidemic. It was noticed by Dr. Mayne, that in the worst cases “the extremities were cold and bluish, and that the disease assumed very much the aspect of cholera.” I

have observed this cold and bluish condition of the entire surface of the body in some cases. It was well marked in case No. 3; there were also in several cases spots like bruises, or ecchymosis, such as we were very familiar with in the epidemic of scurvy and typhus fever in the year of the famine; but in addition to these appearances, many cases are accompanied by a distinct *eruption*, which comes out with great rapidity, is found over all parts of the body, but chiefly on the lower extremities; is of a very dark colour, sometimes very deep brown, or purple, or even black; the spots are of various sizes and shapes, some small and round, others large and irregular; some appear like large spots of very black purpura, only more mottled and more irregular in colour and shape; others are more confined and raised above the level of the skin, consisting in effusion into its substance; many patients die in this stage, but in some the disease progresses, and these spots are absorbed, as in Case No. 5, leaving a yellowish mark under the cuticle; or, as occurred in cases 1 and 4, and some others, they pass into superficial gangrene, which, in No. 4, was spreading at the time of the patient's death, or is healed with loss of substance—as in Case No. 1.

The suddenness with which this dark-coloured eruption becomes developed, its great extent in many instances, and the profound collapse with which the patients are at the same time affected, give to many of these cases a most terrific appearance, and is well calculated to inspire terror into the beholder. The number of cases in which, during the present epidemic, this eruption has been found connected with cerebro-spinal arachnitis, would alone be sufficient to prove that it does not constitute or indicate any new type of disease; but it was already very accurately described as a constant symptom in the epidemic of cerebro-spinal meningitis which prevailed in France, and which was much more extensive than has ever prevailed in this country. Lefevre observed in that epidemic impetiginous eruptions, and Faure-Villar found in “almost all the severe cases spots of a deep brown, or of a light purple colour, on the front of the body, and on the extremities, not disappearing under pressure, and usually projecting above the level of the skin. Sometimes the spots were of an inky-black colour, and irregular in their shape and size.” Dr. Liddell, of Washington,^a whose account shows how accurately he observed the disease, mentions as one of the symptoms, the occurrence of a cutaneous eruption, consisting of dark purple spots, circular in

^a See *American Journal of Medical Sciences*, vol. xlix., n. s.

shape, somewhat raised above the surrounding skin, with a well-defined margin, and varying in size from a mustard seed to a pea. On incising them they presented an infiltration of dark-coloured blood in all the layers of the skin, and to some extent in the connective tissue beneath. The spots were not arranged in groups; on superficial view they presented considerable resemblance to leech-bites. In other cases "there was a strong hemorrhagic tendency exhibited." "The body was everywhere mottled; there were vibices on the knees, and petechiæ on the legs." "And on incising one of the cutaneous petechiæ it was found to consist of an ecchymosis in the substance of the true skin, and not of a mere effusion beneath the cuticle."

This dark eruption which forms so prominent a feature in those cases, is clearly owing to an infiltration of dissolved hematine, entirely dependent on the decomposed state of the blood, and is not to be looked on as simple extravasation. This is proved by the colour of the eruption being often of a pure black, sometimes brownish, but never exactly like extravasated blood, by the turbid brownish fluid in vesicles under the epidermis, so often seen accompanying these black spots, constituting what Vogel terms gangrenous action, and by the secondary action to which these spots are subjected, rarely absorption, more usually purulent or even gangrenous reaction. It is probable that in some instances, particularly those in which, like Cases II. and IV., there is a rapid effusion into the spinal canal, that the origins of the sympathetic nerve may be effected, and so, through a failure of the vaso-motor nerves, extravasation and other phenomena of deficient circulation may be developed.

There are many other peculiar symptoms which, did space allow, might be enlarged upon, the form of the delirium, the peculiar affection of the eye. This has occurred in several cases; was very well marked in Case V. It commenced as a superficial ulceration of the cornea, and being confined to the lower third was, I think, clearly owing to exposure from paralysis of the lower lid, it was accompanied by severe conjunctivitis, and passed on to inflammation of the deep-seated structures, discolouration of the iris, with fixity and irregularity of the pupils. Case V. confirmed M^r Kenzie's remarks on the efficacy of Belladonna in such cases. In two instances I saw the sight irreparably lost.

In some cases the ulceration of the cornea was more general, and must be referred rather to a lesion of the fifth nerve, being accom-

panied with more or less anesthesia. In one of these cases the whole eyeball rapidly wasted. In all the cases it was the right eye which was affected. The frequency of strabismus may be accounted for by the sixth nerve being, from its situation close to the pons varolii, so often implicated in the disease.

Affections of the joints I observed in very few; but the swelling of the knee-joint in Case V. was very remarkable, and evidently is to be considered as a part of the disease.

Mannkopff, after adducing one case, in which he himself observed redness and pain of the left wrist and ankle, similar to an acute rheumatism of the joints, goes on to say, that as formerly the sero-purulent effusions into the joints were stated by the Swedish Physicians (Hirsch Henob. VIII, 630), to be concomitants of this disease; so also, in recent times have acute swellings of the joints been observed, if not as often, yet sufficiently so, to prevent their being considered altogether an accidental occurrence. He refers, also, to swelling of the joints described as rheumatic, which, in cases by Reinecker and Wunderlich, preceded the meningitic symptoms, and a case of obstinate effusion which occurred to Pfeiffer during convalescence. The French physicians moreover, he says, report of an epidemic meningitis alternately, with acute rheumatism of the joints (Häser, l.c. S. 688), and during the progress of the late epidemic, and usually early in it, inflammation and acute swelling of different joints, occurred in America (Draper), and in Germany (Frentzel, Niemeyer, &c., &c.), which sometimes rapidly subsided, and often became metastatic, as in the ordinary rheumatic affection of joints.

The condition of the urine must also be observed. In almost all who die in the early stage it is found to be albuminous; this I consider to be merely another proof of the extraordinary fluidity of the blood, and its strong tendency to extravasation. In those who survive to a more lengthened period, I usually found the urine of very high density, and loaded with phosphates.

Diagnosis.—While the French authors, in the matter of diagnosis, dwell chiefly upon tetanus, typhoid fever, and a fatal (pernicieuse) intermittent; American authors endeavour to distinguish this spotted fever with cerebro-spinal meningitis from the ordinary typhus.

I have seen very few cases of the present epidemic which could be mistaken for any of these diseases. Cases of the sporadic form of cerebro-spinal meningitis may assimilate the diseases enumerated by French writers, but not the epidemic form, and American

authors themselves, Liddell and Upham in particular, have so well laid down the distinctive marks between typhus fever and cerebro-spinal meningitis with dark eruption that it is difficult to confound them: Murchison, I conceive, has utterly failed in his attempt to connect them. The three diseases which I have seen cases of this epidemic mistaken for, are:—1st. The sporadic form of cerebro-spinal meningitis; as I observed at the commencement of these remarks, cases of the disease in this form are not unfrequent; but the symptoms of nervous lesion are seldom associated with those of excessive fluidity of the blood, consequently, there are wanting the extreme collapse and the peculiar eruption. The sporadic form, moreover, presents frequently many symptoms of a more or less inflammatory type; and what may be termed an antiphlogistic line of treatment is often successful. Many of these cases recover under the free administration of mercury and repeated leeching. Hot skin hyperesthesia, retracted head, are also symptomatic of the sporadic form, while, on the contrary, it wants those spinal symptoms which may be supposed to originate in the medulla oblongata, viz., extreme dyspnea without any affection of the respiratory organs, spasm or paralysis of the pharynx, aphonia, &c., &c. Diagnosis between the epidemic and sporadic forms is of consequence, first and principally as to treatment; and, secondly, as to prognosis, the sporadic form being in my experience much more amenable to treatment. Mannkopff, however, the latest writer on the subject, considers the epidemic form the less fatal.

2nd. Wherever cerebro-spinal meningitis has prevailed, it has been observed that a malignant form of measles has also existed at the same time. I have seen several cases of this latter affection during the last few months—many of them fatal, and some of them mistaken for the cerebro-spinal epidemic. They have some leading features in common.

1. The rapidity with which the eruption is developed—the entire body is covered with it sometimes in less than six hours.

2. The very dark colour of the eruption, and its being interspersed copiously with petechiæ.

3. The sudden and often extreme collapse which accompanies the development of the disease. A satisfactory diagnosis can, however, usually be made.

Although the debility in rubeola may be very great, it never approaches the almost paralytic condition which is found in the very severe cases of spinal fever, and although there may be many

spots of petechiæ, there are never found those ecchymoses from decomposed blood in the substance of the true skin, which are so characteristic of the epidemic; and while the rubeolar eruption is dark-coloured in the extreme it retains its characteristic of being an elevated eruption, and affecting more or less the crescentic form.

A case of *rubeola nigra* will also be accompanied from the commencement with more or less of coryza and symptoms of laryngeal or tracheal, or bronchial congestion, or all combined. In the cerebro-spinal epidemic, I have observed that the pulmonary affections consist in what may be termed secondary phenomena, œdema of the lungs, or diffuse pulmonary apoplexy, and these combined with a more or less emphysematous condition of the anterior portions.

This appearance was exceedingly well marked in Jane Elliott, aged thirty-five, who died in the Whitworth Hospital on April 18th. She received a severe mental shock, which she felt to be her death-blow. She vomited frequently, and became rapidly weaker. She came into hospital on the 16th, being of a light yellow colour. On the 17th the upper part of her body was covered with the peculiar dark eruption. Her breathing suddenly became most rapid—62 in the minute—and she quickly became comatose.

Both lungs were the seat of most intense diffuse pulmonary apoplexy, while the anterior portions were largely emphysematous. The brain and spinal cord exhibited all the characteristics of intense cerebro-spinal meningitis with, what has not usually been found, lymph exudation in the lateral ventricles.

3rd. To those who have not seen many cases of this epidemic, it may seem extraordinary to state that in some few instances it strongly assimilated hysteria; but I have observed, while the majority of the cases were unmistakably well marked—some few advanced very treacherously—for a day or two there was slight malaise and vomiting, lassitude, occasional pains in the back and down the limbs; these were all relieved by warmth and rest, but again recurred, and were accompanied with more or less pain on pressure, amounting almost to hyperæsthesia of various parts; and those symptoms occurring in delicate females, were occasionally mistaken and treated as hysterical, until in some instances the patient's friends and the physician were surprised by the rapidly fatal termination of the illness. I have known at least three such cases to have occurred in this city during the past month. I need not dwell upon the means of diagnosis in this case, but merely observe that when such a formidable epidemic prevails we cannot be too cautious in our diagnosis

or prognosis. Many other forms of fever^a will, from the commencement, take some colouring from the epidemic, and many will, in their progress, be influenced by it.

I would return to the subject of *Prognosis* to state briefly how very uncertain it is. In all cases it is unfavourable. The mortality at the Hardwicke hospital has been at the rate of 80 per cent., and it would appear that middle-aged (eighteen to thirty-six) persons are most disposed to contract the disease and to die of it. It is to be observed that cerebral symptoms are, *quoad vitam*, more serious than spinal. Some cases, as Dermody, No. V., may survive all the acute symptoms, and eventually sink under those of a disorganized spinal cord.

Delirium, however extravagant, particularly if it occur only at night, is a much less unfavourable sign than coma, which, if it come on suddenly, may be looked upon as almost fatal.

The extent and dark colour of the eruption, the early stage and rapidity of its development are another set of symptoms which influence the prognosis. Some German writers showing how familiar they are with the dark eruption in these cases, speak of the more or less *cyanotic* condition or appearance of the patient as most directly influencing the prognosis; others of them look upon the supervention of oedema of the lungs as the most fatal symptom. All authors seem to be agreed that the stage of collapse is the most fatal, and that the prognosis improves as the recovery from that is the more complete.

Treatment.—Mannkopff begins his section on treatment by stating that many cases are so rapid as not to admit of any; and in this all are agreed who have seen many die in what may be termed the first stage of the disease. Professor Banks, in his observations on a remarkable case of this kind in the present volume of this journal, says:—"They are fearfully appalling in the suddenness of the seizure, and the rapidity with which collapse sets in, all remedial agents in such a case are alike powerless, nothing seems to have the slightest influence in staying the fatal progress of the disease."

In many cases the system is so utterly prostrated that the strongest counter irritation, mustard and turpentine—turpentine and liquor

^a During the last month I have observed that few cases of typhus fever have been admitted into my wards in the Hardwicke hospital without having some symptoms referable to the cerebro-spinal system. In some cases they have arisen towards the close of the fever, and have proved very formidable.

ammoniaë—are borne without producing any perceptible effect, either upon the capillary circulation, or upon the patient's senses.

What I have seen most useful in the stage of collapse is external warmth applied to the entire surface by means of flannel bags containing roasted salt, applied along the spine, along the chest, inside the arms, and to the feet and legs, and between them. This will not prevent the application of strong counter irritant applications to the epigastrium, upper part of the spine, and wherever else they may be considered advisable. Small quantities of brandy in iced water may, at the same time, be given in repeated doses, and if the stomach be very irritable, two or three drops of laudanum, or a drop of hydrocyanic acid may be added to each dose. But supposing the patient to have recovered from the stage of collapse, and the symptoms of perverted sensation—diminished or exalted—to have set in, we may consider what line of treatment is to be adopted. So far as the question of treatment is concerned, this is the most important stage; but it is not possible in this, any more than in any form of fever, to lay down absolute rules, or to recommend any one specific plan. Some patients rise out of the collapse with hot skin, injected conjunctivæ, perhaps strabismus, pain and heat of head, deafness and flushed face; these, although the pulse be small and thready, and the body be covered with the large dark spots, or small petechiæ, will derive benefit from leeching and the use of mercury, supporting the strength with small quantities of wine or brandy, thus Wm. Kennedy, aged sixteen, a builder, admitted on the 30th of March, cold, pulseless, stupid, and with dark eruption: on the 1st of April had intense headache, suffused eyes, hot skin, hyperæsthesia, very small pulse, eruption not declining. He was ordered four leeches to the temples, and half a grain of calomel, with two or three of prepared chalk every hour. Two leeches were afterwards applied two or three times, and the calomel was continued until his gums were slightly affected. He made a good recovery. I think the very small doses of mercury very frequently administered is the most useful and safest way to exhibit it in this disease. In Others, on the contrary, like Case No. V., reaction is never excited, symptoms, partly of irritation, partly of compression, of the nervous centres set in, while the lesions of the circulating system persist, or become even more manifest. In such cases I have found great benefit from the combined action of quinine and belladonna in large and frequently repeated doses. Thus in the case of Rose M'Mahon, aged thirty-three, admitted 17th of March, in collapse, with dark eruption,

on following day, pulse returning, constantly moaning, complaining of great pain in head and neck, strabismus, inability to pass urine, eruption increasing. I ordered her two grains of sulphate of quinine, and a grain of extract of belladonna in a pill every three hours, and this treatment was steadily persevered in for several days, increasing or diminishing the quantity according to the urgency of the symptoms, until they yielded altogether; the head was shaved and blistered and she had a small quantity of wine daily. This woman was for several days in a most critical state. She had well marked herpes zoster, profuse perspirations, constant delirium, and what I observed in several, an impulse to swallow everything they would lay hands on, the corners of the bed clothes, towels, and even if they were not carefully watched, the blisters or mercurial dressings which were usually applied to the head or back. She was discharged perfectly cured on the 12th of April. In other cases I gave the belladonna even more frequently. In Case No. V. I gave it for a few days in grain doses every hour until it produced its full effects, a few small doses of opium remedied the gastro-intestinal disturbances which were threatened.

In some cases, particularly in those in which there was much dysphagia, I found much benefit from a liniment composed of the tincture or a strong solution of the extract of belladonna, rubbed well into the nape of the neck and between the shoulders. When the friction could not be borne, a hot linseed poultice, made with either of these preparations, and applied with a covering of oiled silk was often of great advantage. And the extract applied thickly and frequently around the eyes, in the cases of ulcerated cornea, &c., had evidently a more powerful remedial action than could be referred to a mere dilatation of the pupil.

Iodide of potassium seemed to be of use only in cases where all the acute symptoms had completely disappeared, and the patient was still troubled with pains or stiffness in the back or limbs.

I may be expected to offer some remarks on the use of opium, the efficacy of which in this disease has been so much lauded by some physicians, American authors in particular. I tried the effect of it in pretty large doses (from half a gr. to gr. ii. every three hours), sometimes in combination with mercury, sometimes by itself, in cases in which there was either very great pain or continued insomnia, but I was not encouraged to proceed with it, it always dried the tongue and seldom produced sleep, which, if it did come, was not

refreshing, and the patient seemed to me always to wake up in, as it were, a greater paroxysm of pain.

I will conclude these brief remarks on treatment, by a quotation from Mannkopff's recent work, which seems to me to be worth recording :—

“ While our efforts must be chiefly directed against the local inflammation of the meninges, we must never forget that we have to do with a zymotic disease, which tends to lower the powers of life; hence antiphlogistics must be used with caution, and if thus employed they do not suffice to allay irritation, we must also employ quieting means. But if the bodily powers are already very low we must abstain from antiphlogistics, and have recourse to rapidly acting stimulants. In convalescence we must employ these remedies which promote absorption, while we support the patient's strength. We are also to remember throughout the treatment of the case, that other organs besides the nervous centres, the respiratory organs in particular, are apt to suffer, and, therefore, a careful watch must be kept, and such complications be treated on sound general principles.”

PART II.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Lectures on the Study of Fever. By ALFRED HUDSON, M.D.,
M.R.I.A.; Physician to the Meath Hospital.

A WORK on any practical subject recording the experience of Dr. Hudson must be a valuable boon to the profession. With peculiar pleasure, then, we hail a volume on the subject of "fever, the disease which," in the author's words, "beyond all others, presents the strongest claims to our careful investigation, whether regarded as an object of scientific interest or of social importance; whether on account of the varied and complex phenomena it offers for our investigation, or the immense influence which it exercises upon the welfare of individuals and of the community."

The lectures are dedicated to the author's colleague, Dr. Stokes, and were delivered to the students of the Meath Hospital to guide them in the bedside analyses of cases of fever; a subject which, in the author's opinion, has as yet been but imperfectly cultivated, but to the pursuit of which he ardently encourages the student by telling him that "it more than any other disease will call into requisition his knowledge of healthy and perverted function; educate his faculty of observation, cultivate his talent for judging the value of existing signs and symptoms," adding that while "no single disease will teach the student so much that is of value, or so train him for the future practice of his profession as fever, yet it must be admitted that the difficulty of the study is in proportion to its interest." To solve these difficulties or to aid in their solution is the aim of the author, and we will now endeavour briefly to analyse how far he has effected his object.

The first lecture is devoted to the "theory of fever," and it is classed with all other morbid poisons as producing its effects on the human system by means of catalysis, which the author explains to mean that the "poison has a force or power by which a compound body like the blood is decomposed by mere contact with it." We would rather incline to the belief that in the majority of cases the fever poison is introduced directly through the nervous system; in no other possible way can be accounted for, the instantaneous communication of the disease which the recipient himself is often distinctly conscious of. Of course the blood becomes vitiated at a

more or less early period; but, even then, we doubt that it is strictly in the manner of catalysis, but rather by cell growth, which will more satisfactorily account for what Dr. Hudson himself so much insists upon, the susceptibility to the disease being exhausted, and the various attempts at crisis at various periods.

Lecture IV. is devoted to pathology and symptomatology. The different modes of invasion of the various forms of fever is, of course, first considered. The author holds that if the fever be traceable to communication with a typhus patient it will prove typhus; but if the cause be civic miasm, enteric fever will follow. The classification of the pathological phenomena is the usual one of primary and secondary, but it is very intelligibly put:—

“Primary or essential arising out of the action of the poison on the blood and nervous system and its affinity for certain tissues or organs, as well as out of the special predisposition of the organ which in certain states may be said to attack the fever poison.

“Secondary or accidental arising (a) from some peculiar exciting cause; (b) from some secondary blood contamination; (c) from reactive irritation. The secondary phenomena alone can be termed complications; those of the first class are either purely tonic or arise from the tendency of the poison to be eliminated by certain surfaces or excreting organs. To the tonic action of the poison we refer the majority of the nervous symptoms of typhus. To the elimination effort of the system we ascribe the infiltration into Peyer’s follicles and the mesenteric glands in typhoid.”

The symptoms of the various forms of fever are considered *seriatim* and completely. We cannot follow them throughout, but we may refer to the value set upon at least two:—1st. Temperature, in which the conclusions of Dr. Aitken are strictly adopted; and the author’s faith in their value is well shown by his prescience (some would term it rashness) in cupping a patient advanced in typhus, because his temperature rising four degrees, with increased rapidity of breathing, indicated the approach of a pneumonia of the sthenic form with rusty expectoration.

In the remarks upon the characteristic eruptions we find the following:—

“You will occasionally find it by no means easy to distinguish the one form of eruption from the other. An imperfectly developed or discrete typhus eruption in its earlier stages may be readily mistaken for a typhoid, if this is more than usually abundant; the frequent uncertainty of the date of access of typhoid favouring this error. Such cases require the

exercise of caution and further investigation, and you will best arrive at an accurate diagnosis by a careful inquiry into the origin and previous history as well as the accompanying symptoms of each case. Not unfrequently we will have reason to believe that the two poisons co-exist in the case, the conditions being commingled or the one succeeding the other."

We consider this statement to be one of great importance. There can be no question as to these facts; but, on the other hand, they are no evidence of the identity of the two diseases which they are daily quoted to prove. There is too much stress laid upon the one symptom of the eruption in the matter of diagnosis, and if any physician could be found so imprudent as to rely upon that or any one other symptom he would frequently be mistaken. The complete distinction between typhus and enteric fever is now so universally recognised that it seems to many strange that they should ever have been connected. Yet there are some who still assert the unity of the two diseases, because in individual cases some particular symptom will frequently arise, which, according to their rule, belongs more properly to the other disease; thus, for instance, if diarrhea occur in an otherwise well marked case of typhus, or if, in what would otherwise be termed enteric fever, the temperature rise very high very early in the disease, such cases would be termed *mixed cases*. The distinctive marks between typhus and enteric fever are, by almost all authors, now clearly laid down, and Dr. Hudson also holds their complete and perfect distinctness; and we may here anticipate his remarks upon diagnosis, and enumerate the following as the broad grounds upon which he bases the distinction. The two diseases differ.

1. In their invasion and early history.
2. In their conformity to the laws of periodicity.
3. In their duration and mode of termination.
4. In their external phenomena, more especially their eruptions.
5. In the special affinities of the poisons, the order of symptoms, and their internal pathology.
6. In the mode of fatal termination.
7. In the anatomical appearances.
8. In the law regulating the mortality with regard to age.
9. In the comparative rapidity and security of the convalescence in typhus, and its complete exemption from relapse as contrasted with the comparative certainty of relapse in epidemic synocha; its frequent occurrence in typhoid; and the other risks and uncertainties of the convalescence in this disease.

Instead of describing the different forms of fever as they are met with, Dr. Hudson, we think wisely, goes through the different lesions as they are found to occur in the various organs. Lectures V. and VI. are devoted to the cardiac and pulmonary lesions.

Dr. Stokes' remarks upon the softened condition of the heart in typhus are quoted at full length, and that condition of lung which he has termed aborted or arrested typhus, an explanation which we can by no means accept.

There are other ways for explaining the phenomena connected with this disease: why should not the fever, although of a very low type, be symptomatic of the local lesion which we know to be most varied in point of time as to its development, or at least in the proof of its existence by physical signs; and we confess it is contrary to all our experience of typhus fever to suppose that once established in the system it will *abort*. The analogy adduced that in certain cases of simple variola we see the fever to subside on the appearance of the pustule is really no analogy at all, nor need we delay to explain how it is not so.

Dr. Hudson alludes to another form of pulmonary affection which he says is unnoticed by any other reader:—"In several instances in which fever was attended with cerebral symptoms, particularly with great emotional excitement, and with marked cerebral breathing. These symptoms have been succeeded, after some days, by inflammatory congestion of the upper lobe of one or other lung. This complication differs from the affection described by Dr. Stokes: first, in the period in which it has occurred; secondly, in not being attended with resolution of the fever; and lastly, in having been always preceded by highly marked excitement of the emotional nervous centres, as if originating in the nerves of the respiratory organs."

There is no doubt but that irritation of the gangliform plexus of the vagus will cause general and intense pneumonia; and we can therefore imagine that, as Jones very well puts it, "certain nerves, when stimulated, exert a very considerable influence in the districts to which they are distributed, in the way of increasing the amount of blood circulating through the tissues, and herein exactly antagonise the ordinary vaso-motor nerves accompanying the arteries whose activity induces the opposite condition."

Lecture VII. comprises the *abdominal lesions* or rather the derangements of the digestive organs. The absence of thirst is judiciously considered as one of the most serious symptoms, more especially when conjoined with other forms of an obsthesia, to which,

and not to an arrest of the function of nutrition, as stated by Corrigan, it is referred. The different forms of vomiting are very well described, and the different forms of diarrhea; and the student is warned that even in far advanced enteric fever there may be no diarrhea.

Lecture VIII. is on the derangements of the urinary organs, and is occupied with many practical remarks upon their nature and mode of occurrence. The two last subjects under this heading are particularly worthy of being remembered—1st. That what may appear at first view to be simply the adynamia of fever is often, in a great measure, due to secondary blood contamination—in fact, to uremia; and 2ndly, The occurrence of bullæ during the course of fever should lead us to pay more than ordinary attention to the state of the urinary secretion. The existence of these bullæ being ascribed by Henderson and others to the conversion of the retained urea into carbonate of ammonia, which has the power of dissolving the fibrin of the blood.

Lectures IX., X., and XI. comprise the cerebro-spinal lesions, the importance of which is not over-estimated in the assertion, that while they are not seldom obscure, latent, and difficult of diagnosis, the safety of the patient will often depend upon the sagacity with which they may be recognised or even anticipated, and the promptitude with which they may be met by suitable and energetic treatment. The various causes of these lesions are gone over seriatim and fully. The difference of the symptoms, according to the different parts of the cerebro-spinal system affected—the principal object is, of course, to show how the symptoms arising from reflex irritation—from the toxic action of the fever poison—from the effects of secondary blood poisoning in its various forms—are all to be distinguished from each other, and from those cases in which there is more or less of organic lesion, which the author, in our opinion, most erroneously considers the effect of *inflammation*. The cases which he adduces in support are most unfortunate for his purpose and inapplicable.

Lecture XII. enters fully into the subject of diagnosis; and Lecture XIII. exhausts the subject of prognosis. It is very comprehensive, and very accurate, and will repay a careful perusal. Lastly, Lectures XIV. and XV. are devoted to *treatment*. In these important chapters the first subject considered is, “are there any means by which the operations of the poison once set up may be arrested, shortened, or modified, if these measures are employed at an early period”—in other words can fever be arrested? Dr. Hudson

considers “that hundreds of cases of fever have been arrested chiefly by those measures which medical fashion, rather than reason or experience, has long since consigned to comparative neglect, viz., blood-letting, emetics, and cold affusion.” We may pass over the arguments of Watson, Todd, &c., on the impossibility of proving the success of this plan; when it fails it may be said to have been tried too late; when it succeeds it cannot be proved that any disease, much less fever, was really cut short. We have often known a set of symptoms as alarming and decided as ever ushered in a specific fever disregarded, and not followed by any bad consequences worse than a mild sore throat or an attack of herpes, while the infection was directly from a typhus patient. But we think the principle is erroneous that typhus once established can be arrested, and we look upon the practice alluded to as most hazardous. We can call to mind more than one valuable life sacrificed from adopting these ideas, and we feel that we cannot too strongly express our disapproval of the advice; but let us not be misunderstood. We have no fears but that, in the hands of Dr. Hudson, such practice, if adopted, would be most judiciously carried out; the fit objects for it most carefully selected, and therefore the success of it be almost certain, or at least it would not do harm; but knowing that the fit objects for it are but the very few, we do fear lest, justified by such authority as Dr. Hudson, many may imagine that it is a sound practice to be generally adopted, and we fear most of all that medical men will venture to practice it upon themselves. It is true, Dr. Hudson says, that to be successful these measures should be employed within the first thirty-six hours; but where there is such an inducement held out, as the prospect of cutting short a fever, there are those who will venture on any measure, however desperate. We can unfortunately call to mind not a few valuable lives thus lost. A state of collapse has been induced, and the power to rally from it had been taken away. An irritability of the stomach has been brought on, and it never again could be calmed. In our opinion the cases are few indeed to which this plan of treatment is applicable; and, without any reproach to the profession, we may add that the hands into which its administration should be trusted are also fewer. Dr. Hudson goes on to mention two other eliminant medicines, sudorifics and purgatives. He has followed up the action of the emetic by sudorifics with advantage, and has heard of other physicians apparently cutting short fevers by producing copious and long-continued sweating. He adds:—“Once, however, the disease is

established, no practice can be more injurious than either the emetic or diaphoretic treatment, unless it be the purgative ;" but the difficult point to determine is when the disease is to be considered established ; we cannot reckon it by time—twenty-four or thirty-six hours—as proposed, patients have died of fever in less.

The sudorific plan is of all the eliminative modes that usually received with most favour, and for that reason requires a word of caution. As we have seen an uncontrollable irritability of the stomach induced by the emetic plan, so we have seen a condition of the most profound debility induced by the sudorific plan ; moreover, in our opinion, it induces a tendency to an early attempt at crisis by perspiration, which, to say the least, is not desirable. "I have such a dread of crisis by perspiration," writes Corrigan, "that I would rather see a case of maculated fever considerably prolonged than that the risk of crisis by perspiration should be incurred."

In our opinion this subject was treated of by Marsh exactly forty years ago in a manner which time and experience have proved to be the well-grounded and judicious practice. In the remarks of that eminent physician it will be observed that while he fully recognised the importance of the treatment in the latent period, he was observant of the cases in which advantage was to be expected from it, and of the individuals on whom it could with safety be practised.

"The latent period of fever is a time during which the judicious application of remedies would frequently avail to render the ensuing malady less severe and dangerous ; and frequently too a slight ailment is converted by neglect and mismanagement during the latent period into a serious and dangerous illness. In conducting the treatment it is of considerable moment to be able to learn the origin of the complaint. The diseases which arise from impressions of cold upon the surface require a different mode of treatment from those which spring from a contagious source. The former will yield more readily and certainly than the latter to medical treatment, and may even be frequently arrested in their progress, and cut short altogether. Even in contagious fever this may occasionally, but I believe infrequently, be accomplished. In general, notwithstanding every effort, contagious disease will run a certain course, and though it may be mitigated and the severity of its symptoms abated, it will still proceed, and will not often be stopped short in its career. Occasionally, powerful emetics administered during the latent period will give the system a shock sufficient to alter the course of the symptoms, and to enable the constitution to

throw off the disease. Emetics, however, even at this early period, are not suited to all cases of fever. Sometimes I have known this remedy produce little other effect than determine morbid action to the stomach, and render that viscus exceedingly irritable during the whole course of the fever. The effects of an emetic will be rendered more effectual if followed by an opiate. *In many cases of relapse* I have adopted, with much advantage, this mode of treatment. On the occurrence of those symptoms which indicate a return of fever I have given a mild emetic, and after its operation a full opiate; and have occasionally found the patient next morning nearly free from febrile symptoms, or if still existing, so mild as to promise a favourable and a mitigated disease."

"The utmost which in general can be done during the early stage of fever is to mitigate the symptoms and render the disease mild."

"I do not think that our attempts to cut short contagious fever are as often successful as is generally believed; and I am sure it requires much judgment to determine the kind of case and constitution in which it is safe to make the attempt." The remainder of Marsh's observations on the treatment of the latent period of fever are also well worth perusal; his cautions against the abuse of purgatives; his remarks on antimonials, &c., &c., we would gladly quote, as bearing upon the subject of the cutting short of fever, but want of space prevents us.

Dr. Hudson's remarks upon the abuse of purgatives are excellent, as also are his observations upon the proper administration of food. He puts into its proper place Graves' overstrained and perverted ideas about food in fevers. The tendency of the present day is unquestionably to over-feed and to over-stimulate in fever, so that the sentence—"some are even positively injured by it" (wine), is one deserving of great consideration, as also, "food like wine should be given at moderately long intervals;" and again, "I say, liquid nourishment, because the stomach of a fever patient is incapable of properly digesting solid food."

With regard to sleep the direction is well-advised to secure the return of sleep, not always by the exhibition of narcotics, but by the judicious management of the patient with reference to this function.

We doubt that the author has advised the best remedial measures in cases of hemorrhage from the bowels. His observations on the urine are very important. It is not sufficient merely that the urine is not retained, we should also satisfy ourselves that urea is not

retained. The causes, symptoms, and treatment of this most dangerous occurrence are fully considered.

We next come to the cerebro-spinal lesions in fever, the proper treatment of which is perhaps the most difficult problem which can be put. The advantages of wine, opium, antimony, local and general bleeding, mercury, turpentine—are all discussed and allusion is made, if not a full description given, of the cases to which each remedy is applicable.

The author dwells much upon, and favours highly the plan of treatment by tartar emetic, with or without opium, in certain cases, the marked success of which he considers to be due to its eliminative action “by which in most of Graves’ cases evacuation was brought on in several modes, as by vomiting, purging, and copious diaphoresis or diuresis.” Dr. Hudson advocates also the use of the lancet more freely than in our opinion the epidemics of the day warrant. He considers “that the ill effects ascribed to bleeding have often been strictly due to the abstinence enforced at the same time,” and he cautions the practitioner to repair the waste produced, by administering nourishment, “and also to obviate the nervous excitement and irritability which so frequently follow the abstraction of blood by means of opium, and even by wine or brandy.” We would be slow to reject the testimony of Dr. Hudson upon the efficacy of any plan of treatment. He has the character (and he deserves it) of being a safe and a judicious practitioner; but on his own showing, bleeding and tartar emetic are hazardous remedies. We are satisfied that they have succeeded in Dr. Hudson’s hands, and they would probably be successful with others; and we, therefore, highly approve of their being *recorded*, but we are satisfied that they are measures calculated for “desperate circumstances,” and not calculated to enter into the treatment of ordinary cases of fever. There is a form of reflex cerebro-spinal irritation which we have often seen, but which Dr. Hudson has not noticed. It occurs very late in fever, and is caused by great accumulation in the intestines. The symptoms of cerebro-spinal disturbance are extreme, and what chiefly renders the case difficult of diagnosis is the peculiar condition of the abdomen. It is well described by a French physician, who is evidently familiar with it. “L’abdomen se resserre, se creuse, pour ainsi dire, en s’appliquant contre la colonne vertebrale, les dejections alvines que l’excretion des urines se suppriment. En un mot toutes les fonctions sont perverses ou suspendues.” When under the action of suitable purgation, &c., the alvine contents are discharged, the quantity found to have been

retained is most surprising. Unless seen it would not be credible that an abdomen so contracted could have contained even half so much. The almost immediate disappearance of the cerebro-spinal symptoms prove the two conditions to have been in the relation of cause and effect.

We next have some remarks upon critical days, and the variations of treatment likely to be required at the time of crisis—the form of delirium which sometimes occurs at this period and its treatment—its aggravation by (if not origin in) blistering. This latter caution we can re-echo, for we have seen, more than once, confirmed and prolonged mania follow the injudicious treatment of this delirium. After a few further practical remarks upon ulceration of the intestine and its consequences, the author closes these chapters with some comprehensive rules as to the general management and special treatment of fever.

The appendix extends over 68 pages, and contains many valuable cases and extracts from lectures and reports in illustration of the author's views, or of facts to which he has referred, and it ends with some well-digested remarks upon the long-recognised differences between typhus and enteric fever.

We have thus carefully gone through Dr. Hudson's "*Lectures on the Study of Fever*," and it will be observed how comprehensive is their scope, and how fully they accomplish the object with which they were written—their attentive and careful perusal will repay the reader—they are well arranged, although on a plan not generally adopted, and one by no means easy for the writer, but most useful for the student—collecting the symptoms common to all classes of fever according to particular sets of organs, and then dissociating them as they indicate each particular kind.

We regret that we cannot congratulate the publisher on his part of this work. The *getting up* of the volume is discreditable to Dublin, and the mistakes which the reader has passed over are numerous. Besides a long *Errata*, we find *consolation* for *consolidation*; the *colour* contained *faces*, instead of the *colon* contained *fæces*, and various other such mistakes; and all through the work *æ* for *æ*; and though we do not ourselves use these diphthongs in words fully established as English, because Johnson, Mayne, and our best authorities say they have not, properly speaking, any place in the English language, we hold that those who do use them should follow the original construction of the words in which they occur.

*Irish Sanitary Arrangements under the Poor Law and Medical Charities Acts.**

FOR many years past the preservation and improvement of public health has been one of the most important branches of social science, and has been much discussed at social science congresses and meetings, and in connexion with the efforts made for the amelioration of the social condition of the people, none have been more strenuously advocated or more deserving of advocacy than that of sanitary reform; various and strong representations have been made by sanitary reformers, and by the Poor Law Commissioners in different annual reports to Parliament, respecting the defective state of the laws affecting public health and the necessity of extending to Ireland the provisions of the English Nuisance Removal and Diseases Prevention Acts of 1855 and 1860. At last these efforts have been crowned with success, by the passing, during the past session, of "The Sanitary Act," which received the Royal assent on the 7th August last, and which was thus referred to by Sir Robert Kane in his address at the opening meeting of the present session of the Statistical Society:—"We have obtained a Consolidated and improved Sanitary Act for Ireland, organizing, under the direction of the public authorities, an admirable system of control and supervision, through which it may be hoped that these agencies, whether of commission or omission, by which disease might be generated or conveyed, may be, if not absolutely removed, at least materially narrowed in their range of influence, and mitigated in their force."

It is a matter of congratulation that the work of sanitary reform has been brought to such a successful issue, and is now, with rare exceptions, being actively and earnestly carried out by the Government, the Poor Law Commissioners, the Civic Authorities, and Boards of Guardians throughout Ireland, to whom ample powers are given for sanitary regulations.

Before entering into the details of the organization and machinery for affording medical relief and enforcing sanitary regulations under the Medical Charities and the Sanitary Acts, it is but right to observe that we are not unmindful of the vast amount of good effected by public and private efforts for the improvement of the

* This article was prepared for publication some months ago, but appears more appropriately now in connexion with the history of the cholera epidemic.

condition of the people, and also, that we have no desire to overlook the noble system of hospital succour for which our metropolis and country is celebrated. We simply desire, on the present occasion, to confine ourselves to a review of the machinery by which the Legislature has placed medical relief within the reach of every proper recipient, and by which the authorities are enabled at once, upon the appearance or threatened invasion of any epidemic disease, to extend their operations, and exercise the powers given them under the Acts already mentioned for the relief and protection of society.

The observations which follow, in which these advantages are stated more in detail, will, we think, establish the following propositions:—

I. That Ireland is at present in the enjoyment of a system of medical relief equal, if not superior, to any country in Europe, and certainly very much in advance of that which prevails in England.

II. That the organization of the system, which is comparatively inexpensive, is equally applicable to the most crowded city and the wildest and most remote country or mountain district.

III. That adequate medical relief is accessible to all poor persons needing it, without delay or difficulty.

IV. That the organization is such as to be immediately available in the event of an invasion or outbreak of epidemic disease, and is capable of immediate expansion to meet any emergency that may arise, and that being thus always prepared for an emergency, any invasion of epidemic disease can be met at once, and the calamitous results, both in a sanitary and economic point of view, which must follow, if the preparations had to be made after the disease had established itself, avoided.

Since the introduction of the Poor Laws into Ireland the geographical arrangement and formation of unions have been frequently turned to account, by the Legislature, for purposes of an imperial and local nature. On the 11th September, 1838, when instructions were issued from the Poor Law Commission Office in Dublin to the assistant commissioners, respecting the principles to be observed by them in the formation of unions, the following words were used:—"It is highly important that all the unions should be formed as compact and complete as possible; for when the country shall have been worked up into unions, each having an organized machinery and a principle of self-government, and with the market town as a centre or little capital, it can scarcely

be doubted that they will be made available for other purposes as well as for the administration of the Poor Law." It is remarkable how these prescient views have been fulfilled, the Legislature having since constantly made use of the Poor Law machinery and officers for the purpose of obtaining parliamentary returns, and carrying into effect measures of a practical and important character connected with valuation, rating, parliamentary franchise, burial boards, vaccination, the registration of births, deaths, and marriages, and, lastly, committing to the central Poor Law authority the care of the public health and sanitary laws of the country, and the duties connected with them, which in England are under the control of the Board of Health and the Privy Council.

From the latest information available, it appears that in the 163 Unions, into which Ireland is divided, there are 3,438 electoral divisions, represented by 7,456 guardians, who meet weekly for the transaction of business. It also appears by the last Medical Charities Report, presented by the Poor Law Commissioners to Parliament, that the 163 Unions are likewise divided into 716 dispensary districts, with 1,038 dispensary stations, under the care of 786 medical officers and 39 apothecaries, and that in 54 of the districts, 77 qualified trained midwives have been appointed.

We believe that every workhouse in Ireland has an infirmary attached to it, and that almost every Union is now provided with a detached fever hospital, situate at or near to the workhouse premises, serving not only as a protection against contagious disease to the establishment itself, but as an hospital available for the population of the Union.

The average distance of the extreme limit of each Union from its workhouse is about eight miles, and the fever hospital or fever ward attached to it, forms a most valuable check to the spread of contagious epidemic disease, both in town and country.

The Dispensaries are under the management of 14,215 members of committee. These committees are constituted of Guardians resident in the district, or occupying, or possessing property in it; and of resident ratepayers, possessing property of at least £30 per annum, elected by the Guardians.

Dispensary relief is afforded by the issue of tickets by members of committee, by relieving officers, and by wardens appointed by the guardians. There are, exclusive of relieving officers and wardens, whose numbers we have no means of ascertaining, 14,214 persons,

or one person to every 1,464 acres, 98 persons to each Union, and one person to every 407 of the population, on the average, distributed over the country, authorized to grant tickets. The extreme distance of the limits of dispensary districts from the nearest dispensary station averages about two miles.

Placards setting forth the dispensary arrangements, with which it concerns the poor to be made acquainted, and the names and residences of the persons authorized to issue relief tickets, are annually posted throughout the union and district. In addition, boards of guardians are required to furnish to each constabulary and police station, information regarding the limits of relief and dispensary districts, and the names of persons competent to afford relief, and responsible for doing so.

This arrangement places the means of affording information respecting Poor Law and Medical relief within the power of a well organized intelligent body of 11,162 men, and 653 superior officers.

There is also a large staff of relieving officers, whose duties and powers are very extensive, for affording medical and provisional relief in sick and urgent cases of destitution.

The number of midwives holding office under the Medical Charities Act appears to be very insignificant; we trust that the importance of more generally employing this useful class of females will be more fully recognized throughout the country.

These appointments are of great value; they are congenial to the wishes of the poor, and are likely, in many cases, to lessen suffering and save life; they would relieve the medical officers from an irksome attendance without, at the same time, relieving them from their responsibility in serious cases.

We have heard it stated that ladies possessing a property qualification, are entitled to be appointed members of a dispensary committee; but we are not aware of any case in which they exercise a greater power than that of issuing tickets for medical relief.

Having asserted that the system of medical relief in Ireland is much in advance of what prevails in England, it is but right to support such assertion by the reproduction of a statement made by Dr. Richard Griffin, in a paper on Poor Law Medical Relief in England, published in the Transactions of the National Social Science Association for 1861, that notwithstanding the Poor Law Board requires a medical and surgical qualification, the rule is broken by guardians in Unions uncontrolled by the Poor Law

Board; he illustrates this from Lord Elcho's return of April, 1858, that no less than 632 medical officers out of 3,307, comprising the medical staff, or nearly a seventh of the whole, had but one qualification for office. Although the Poor Law Board had laid down rules that no district shall be assigned to a medical officer which exceeds in extent 15,000 statute acres, or which contains a population exceeding 15,000 persons, it appears from the same return that, owing to an unfortunate proviso in the regulations, there are 583 districts, each of which contains more than 15,000 acres, and some of which extend from 80,000 to 100,000 each; and not content with these enormous areas, the guardians have actually given 629 appointments to 291 medical officers, "thereby showing," as Dr. Griffin remarks, "a reckless disregard of the interests of the poor." Eighty-six of these districts contain 2,289,000 acres, which, at the extreme limit laid down by the Poor Law Board, would give employment to 60 more medical men. There are 23 Unions, in each of which there is only one medical officer, and one of these Unions has 122,000 acres in it. In Wales, mileage is substituted for acreage, and although seven miles is fixed for the limit of a district from the residence of a medical officer, there are 70 districts extending beyond that limit, and one up to 18 miles. There are also 120 districts in Wales, in which the population of the district exceeds 15,000, and one extends to 40,000.

Dr. Griffin also states that there are 266 medical officers who annually attend from 1,000 to 2,000 patients each.

Because properly qualified medical practitioners will not, in some Unions, take office, the guardians add indirectly to the salaries of those they employ, by giving them additional vacant districts. In their Thirteenth Annual Report, the Poor Law Board stated that they had considered it their duty to resist the disposition of the guardians to lower medical officers' salaries, and that from 1857 to the date of their report, thirty-two Unions had reduced the salaries of their medical officers by £1,514. It is, therefore, not a matter of surprise to find Dr. Griffin expressing the opinion that the inducement for Poor Law medical officers to continue in office are of too slight a nature, when no less than 899 resignations took place in the course of the three years previous to his writing.

Before entering into details to support the remainder of the propositions we have advanced respecting the benefits enjoyed under the present administration of medical relief and sanitary laws, it may be desirable to give an outline of the dispensary system in

operation in Ireland before 1851, so graphically described by Judge Longfield in his address on Social Economy at the meeting of the Social Science Association in Dublin. "This system was briefly as follows:—Any set of men, by subscribing funds for the purpose, might establish a dispensary in any part of the country they thought proper. The Grand Jury of the county was authorized to contribute to its support a sum equal to the subscriptions. The election of the medical officers and the management of the dispensary were left entirely to the subscribers."

"The imperfections of this system were obvious; but an inquiry into this system was directed in 1840, and a report made in 1841, disclosing, among other evils, the following state of things:—The number of dispensaries was insufficient, and their situation ill-chosen. The position and even the existence of a dispensary depended not upon the wants of the poorer but upon the subscriptions of the wealthier inhabitants. Accordingly, although in a rich district, the medical relief given to the poor might be sufficient, yet in a poor district there would be either no dispensary, or one extending over so large a district and so numerous a population, that the ill-paid officer attached to it must have been unable to discharge even a small proportion of his duties. In some cases relief was limited to those who should attend at the dispensary in person, or pay the doctor a small sum for calling on him. . . . Sometimes the medical officer was non-resident, performing his duty by occasional visits to his dispensary. Sometimes the same officer had several dispensaries, ten or twelve miles distant from each other, under his charge. Sometimes he had no medical qualification. The subscribers paid no attention to the management of the dispensaries. The support of the medical officer depended upon his success in collecting subscriptions and keeping the subscribers in good humour; and, accordingly, whatever might become of the poor, he was sometimes obliged to give his services gratuitously to the subscribers themselves and their families, their horses, and their dogs. Sometimes the medical officer was permitted to retain all the subscriptions and Grand Jury allowance, out of which, however, he was obliged to pay all the medicines he prescribed. You may be sure that in those cases, the poor did not swallow much expensive physic. The salary of the medical officer was sometimes only £40, and sometimes less than £30 per annum."

A partial and imperfect system of medical relief, unattended with responsibility in its agents, and resting on a basis at once uncertain

in its duration, and unequal in its pressure as a tax, has been exchanged for a system uniform and universal, supported out of the poor rate, and influenced in its duration by well-defined responsibilities under the duration and control of a central authority. "Under the present system," Judge Longfield observed, "the dispensaries are independent of voluntary subscription, they are situated where they are most likely to be required, they are managed locally but subject to central control, which takes care that the influence of the rich shall not intercept for themselves the advantages intended for the poor."

We cannot but refer with gratification to the improved position and the high character of the medical gentlemen at present engaged under the Medical Charities Act, to their generally painstaking, zealous, humane, and conscientious discharge of their duties; under the present administration their professional status has been properly upheld, the qualifications required for office are of a high order, and there is an evident and, we hope, a growing desire on the part of the authorities to fix their salaries at a proper remunerative amount.

We believe the expenditure under the Act has not to the present time exceeded the anticipations of its promoters. We were in the House of Commons when the Medical Charities Bill was introduced by the Chief Secretary for Ireland, Sir William Somerville, the present Lord Athlumney; in the able and interesting statement he then made, he observed that it was calculated the expenditure under the proposed measure would not exceed twopence in the pound, and now, at the end of many years, the expenditure barely exceeds that sum, notwithstanding the improvements in the salaries of officers, the development of the system of medical relief, and the additional expenditure occasioned by epidemic disease.

Although not intending to enter into the question of expenditure,^a we cannot here avoid remarking that the benefits of a well-organized system of medical relief are incalculable in restricting destitution and preventing ultimate pauperism; in affording to a

^a The following remarks appear in the course of Dr. Mapother's lectures on Public Health:—"A well-directed sanitary organization is capable of saving, in Ireland, thousands of lives yearly, and of protecting very many thousands from pestilence and the pauperism and misery which follows in its wake." "It has been often shown that sanitary improvements lessen public expenditure by affecting not only people's health, but their prosperity and contentedness."

large class of well-deserving and industrious poor that immediate help and relief which prevents them from becoming inmates of a workhouse, or a burden on the rates of the union.

In the last reports of the operations under the Poor Law and Medical Charities Acts, we find that during the year ended the 30th September, 1865, there were 201,386 persons admitted to the workhouses; of these a large proportion were infirm and young people; 62,291 were admitted in sickness; 18,410 in fever, or other dangerous contagious diseases; 41,498 suffering under other diseases, and 2,383 from accidental injury. During the year the average daily number in the workhouses was 53,917, of whom the average daily number in hospital was 18,206, including a daily average of 1,824 fever, and 16,382 other patients. The total number of cases treated in the hospitals of workhouses, including the cases in them at the commencement and during the year, was 123,048, viz., 3,060 cases of accidental injury, 92,481 cases suffering under other diseases, 27,507 cases suffering from fever.

During the year ended the 31st December, 1865, 6,820 cases of ophthalmia were treated in the workhouse hospitals.

It further appears that in the year ended the 29th September, 1865, outdoor medical relief was afforded to 837,669 persons, of whom 635,336 were relieved at the dispensaries, and 202,333 were attended at their own homes on visiting tickets.

During the same period, the dispensary medical officers attended 6,632 cases of scarlatina, 2,000 cases of small-pox, and 26,566 cases of fever.

Under the provisions also of the Compulsory Vaccination Act, 172,099 children, including 2,957 in workhouses, were gratuitously vaccinated during the year ended the 31st December, 1865.^a

^a Since the above was placed in type, Mr. Gathorne Hardy, President of the Poor Law Board in England, when introducing, on the 8th February, the Metropolitan Poor Law Bill, stated that believing that half of the pauperism of the country begins with sickness, he instructed Mr. Lambert, an officer of the Poor Law Board, to inspect the dispensary system in Ireland; that he had made a report, upon which he proposes to establish, in the metropolis, a system calculated to diminish the amount of sickness. Mr. Hardy observed, "The advantages of this system are stated by Mr. Lambert in better words than I could employ," and read the following extracts from Mr. Lambert's Report:

"With regard to the general operation of the Dispensary Act, I find that Mr. Power, the Chief Commissioner, with whom I had the advantage of more than one conference on the subject, and the Poor Law Inspectors to whom he introduced me, are unanimously of opinion that it has proved to be universally beneficial, especially in all those large places where there is a resident apothecary acting as dispenser.

"Having stated the objections which have been made to the dispensary system, I now proceed to advert to some of the advantages derived from it.

The benefits derived from the valuable organization and machinery of the Poor Law and Medical Charities Act, in the prevention and mitigation of epidemic disease, are strikingly illustrated in some observations by the Commissioners in their last report, in which they refer to the successive and severe epidemics which visited this country at various periods, and show that from the arrangements then made, the confidence of the people was sustained by finding that the machinery for contending against the epidemic was in operation before they were aware that the disease was amongst them.

The Commissioners observe that the provisions of the Nuisance Removal and Diseases Prevention Acts of 1848 and 1849, were brought into active operation in the years 1853 and 1854, when the last serious invasion of cholera took place in Ireland. The first alarm on the subject was at the close of the year 1852; but the disease did not make its appearance as an epidemic until late in the Autumn of 1853. From that time until April, 1855, cholera prevailed occasionally as an epidemic in some places in Ireland, but the greater part of the country was free from the invasion.

During this period the organization of Dispensary Districts under the Medical Charities Act, which had been completed at the time

“1. It insures for the destitute sick poor a sufficient supply of all necessary and proper medicines and medical appliances.

“2. It enables those who are not confined within doors to obtain medical advice at fixed hours, and within a convenient distance from their homes.

“3. It insures for those who are unable to go out, medical attendance, and enables them to obtain their medicines promptly.

“4. It affords facilities for vaccination, as well as for medical relief generally, by establishing fixed places at which it is well known that the medical officers must attend at stated hours.

“5. It provides an organization always ready, and capable of expansion if necessary, to meet any outbreak of epidemic disease with promptness, whilst at the same time it is calculated to prevent disease becoming epidemic by early treatment, and by procuring the adoption of precautionary measures in any locality which may be threatened. These benefits have recently been largely realized in Ireland in reference to cholera.

“6. By preserving a record of the medical treatment in every case, it furnishes a test of both the skill and the attention of the medical officer.

“7. It prevents that conflict between interest and duty which must so often arise in the mind of the medical officer when he himself is required to provide medicines out of his salary.

“I think it right to add, that after giving my best consideration to the system of dispensary relief, I am of opinion that it is admirably adapted to the exigencies of large and densely populated communities, and I do not hesitate, therefore, to recommend that it should form an element in any scheme for the improvement of Poor Law Administration in this metropolis, subject, however, to a restriction, such as I have indicated, with respect to the issuing of tickets for relief.”

of the visitation, was applied with great success to the mitigation of the disease, and to the curative treatment of individuals attacked either by cholera or by premonitory symptoms, more especially the latter; and many thousands of such cases were so treated with success by the dispensary officers, as well as in the union hospitals, the whole number of cases having been about 40,000.

The result was that during the sixteen months of the presence of cholera in Ireland, a very small amount of mortality from that cause prevailed; the whole number of reported deaths from cholera and diarrhea together being 3,488, while in the London Metropolitan District alone the return of deaths from cholera for the fortnight ended 16th September, 1854, was 3,599. The expenditure on treatment for the same period amounted to only £4,377. In addition to this, however, the sum of £7,260 was expended by the guardians of Unions in the removal of nuisances during the two years; and this was exclusive of the sums expended for a like purpose by the municipal authorities in large towns, such as Dublin, Cork, Belfast, Limerick, and others.

When these very satisfactory results occurred under the operations of the acts, which had been so frequently pronounced to be defective, what may we not now reasonably expect, when we have in active operation the useful and extended provisions of the new sanitary act, under the administration of the Poor Law Commissioners.

As far back as the 27th July last, we find the Commissioners calling the attention of Boards of Guardians to the probability that the epidemic cholera, then prevailing in London, Liverpool, and other places in England, might extend to Ireland, and to the importance of taking timely measures of precaution; this was followed up by other communications on the 2nd, 7th, and 8th August.

On the 9th, 13th and 28th August, and 12th September, the Commissioners addressed each Board of Guardians respecting the new Sanitary Act, the course they intended taking in the event of cholera breaking out as an epidemic, and the powers conferred upon them and other local authorities, for enforcing sanitary regulations.

This Act has, by direction of the Poor Law Commissioners, been published in a pamphlet form, printed together with all the previous acts, or parts of acts, incorporated with or referred to in it, including certain portions of the Diseases Prevention Act of 1855, so far as the provisions were made applicable to Ireland. This book has been most extensively distributed, and its perusal affords evidence that

considerable care and trouble have been taken in its arrangement, and also, that much ability has been exercised to simplify what otherwise would have been complicated. It is likewise furnished with a copious and comprehensive index, which greatly facilitates reference to its varied contents.

In their circular letter of the 12th September, the Commissioners stated that this act contains the whole text of the sanitary laws at present in force in this country, arranged in the order which appeared to be most convenient for reference.

They pointed out that the various local authorities charged with the performance of public duties under these enactments have now each their several functions assigned with sufficient clearness, and that it is of the first importance that each should attend to the duty, for the right and full discharge of which it is made exclusively responsible.

The Local Authorities referred to are, in Ireland, only three—Town Councils, Town Commissioners, and Boards of Guardians. The two former, in all places where they exist, are made the nuisance authority and sewer authority for the district under their respective jurisdictions; in all other places the powers of the sewer authority, and those of the nuisance authority, are vested in the Board of Guardians of the Union in which such places are situate. The powers which relate to sewers and nuisances are both permanent, and demand a steady and continuous course of action from the several bodies to which they have been intrusted; and under the present law, not only the Town Council and Town Commissioners, but the Board of Guardians also, have the power of appointing and paying such Inspectors of Nuisances as may be required in their respective districts, the expenses incurred being payable from the Borough Fund, the Town-rate, or from the Poor-rates, as the case may be.

There are other functions of a like permanent nature arising under the “Public Health Act, 1848,” “The Local Government Act, 1858,” and the “Local Government Act, 1858, Amendment Act, 1861,” the necessary extracts from which were given with the Act.

The Commissioners stated that these latter powers, like those under the Sewage Acts, and the Nuisances Acts, must be exercised in each locality by the Town Council, Town Commissioners, or Board of Guardians within whose jurisdiction, as sewage and nuisance authority, such locality may be situate. The boundaries of the respective

districts are well defined and notorious, so that no difficulty or confusion can arise in that respect; and each body intrusted with these several classes of permanent powers is expected to exercise them within its own district, and no other, and to provide for the expenditure incidental to its proceedings from the funds under its own control.

There is one class of powers created by these Acts which belong exclusively to the Boards of Guardians throughout the whole country, and which, in the absence of any direction to the contrary from the Lord Lieutenant in Privy Council, must be exercised by the Guardians of the Union alone, although the Union may contain places governed by Town Council or Town Commissioners. These are the temporary and occasional powers created by the issue of an Order in Council, under the Diseases Prevention Act, at a time when the country is visited or threatened by cholera, or any other form of fever or pestilence. These powers relate to the treatment of the sick, the interment of the dead, and other matters.

The Commissioners further pointed out that it is under the Diseases Prevention Act alone that they are called on to issue directions and regulations prescribing the mode in which the Guardians, Dispensary Committees, and Union Officers should severally act in executing such temporary powers. An order containing such regulations was then in force throughout Ireland, dated 25th August, 1866.

In their circular letter of the 9th August, the Commissioners recommended the extensive circulation throughout the country of the following useful notice:—

NOTICE.

To Householders and others in each Dispensary District.

To prevent the attack of Cholera, take every precaution to maintain the bodily powers in a healthful condition. Whatever strengthens those powers, lessens the risk of attack; whatever weakens them, adds to that risk.

1. **FOOD AND DRINK.**—Let the daily diet consist of wholesome solid food, bread, well-cooked oatmeal, Indian-meal, rice, good potatoes, or any fresh vegetable well cooked, which you know by experience will agree with you. Take fluids—whether they be tea, cocoa, coffee, new or skimmed milk, or pure water—in moderate quantities. Avoid the use of tainted meat, of stale

fish—especially stale shell-fish,—of raw vegetables, of unripe or overripe fruit, and of acid drinks.

2. **CLOTHING.**—The clothing should be such as will keep the body comfortably warm. Wear a flannel band round the loins and bowels if the weather is damp or cold. Change damp or wet clothes, and keep the feet dry and warm.
3. **AIR.**—Pure air is not less essential to health than wholesome food. Maintain, therefore, carefully, in every inhabited apartment a free change of air; as free, day and night, as is consistent with preserving sufficient warmth and excluding wet. The greater the number of inmates in any room, the more free should be the current of air maintained in it. Beds should be freely exposed to the air during the day. Free ventilation greatly diminishes the risk of contagion from cholera. Though this disease is, with good reason, believed to be contagious, it is certainly much less so than others with which we are familiar,—as typhus fever, scarlatina, and small-pox; and free ventilation, by diluting the effluvia, greatly weakens their power of communicating the disease. Attendance in the room, where a patient lies ill of cholera, of persons not in necessary care of the sick, and wakes of persons who have died of it, are certain means of spreading the disease.
4. **CLEANLINESS.**—Personal and domestic, is of the highest importance. Pay strict attention, therefore, to cleanliness of clothes and person. Remove to a distance from your dwellings, and do not suffer the re-accumulation of stagnant water, dung, any rotting vegetable or animal matter, or other filth. On the discovery of any offensive smell, ascertain the cause, and remove it. Whitewashing dwelling and out-houses, with whitewash freshly made with freshly-burned lime, is to be recommended. The compulsory removal of any filth which your neighbours refuse or neglect to remove, can be speedily procured by two householders giving notice in writing to the Board of Guardians of the existence of such nuisance, and specifying the premises on which it is to be found. On the removal of any very offensive matter, chloride of lime or peat charcoal should be liberally mixed with it, and after its removal the place where it lay should be liberally dusted with one of those substances, or sprinkled with a solution of chloride of lime, in the proportion of about $\frac{1}{4}$ lb. of chloride to a gallon of water. During the whole of the epidemic in London in 1849, not a single case of cholera occurred in any one of the model dwellings of the

poor, though the disease raged in the districts in which these buildings are situated; and there were instances of two, and even four, deaths in single houses close to their walls.

5. TEMPERANCE.—Avoid excess either in eating or drinking. Excess in the use of spirituous liquors is especially dangerous. Intoxication, where cholera is prevalent, is frequently followed by an attack of the disease.
6. EXERCISE.—Moderate exertion of body or mind strengthens. Fatigue, long fasts, watching—all habits that occasion debility,—exhaust the powers of life, and predispose to the attack of cholera.
7. PURGATIVES.—No purgative medicine should be taken during prevalence of cholera, without medical advice.

On the 28th August, the Commissioners forwarded an Order under their Seal, setting forth certain regulations to be observed under the Order in Council of the 17th August, whereby the provisions of “The Diseases Prevention Act, 1855,” were put in force throughout Ireland for a period of six months.

They stated that the several objects for which they were authorized to issue such directions and regulations “Were for the speedy interment of the dead: for house to house visitation; for the dispensing of medicines, guarding against the spread of disease, and affording to persons afflicted by or threatened with such epidemic, endemic, or contagious diseases, such medical aid and such accommodation as may be required.”

Certain parts of Ireland having been declared, by the Order in Council, to be affected by or threatened with cholera, the regulations in the Order necessarily fell under two different heads, one of which was applicable to Unions not yet visited by the disease, and the other to Unions in which cholera was known to be prevailing.

To the first class of Unions, under the head entitled “*Preliminary*,” the first only of the sixteen regulations mentioned in the Order, applied, requiring the Guardians, at their first meeting after the receipt of the Order, to make all the necessary arrangements beforehand, which might enable the remaining provisions to be carried into effect at once, on the actual appearance of cholera in the Union.

Already these arrangements, so far as they regarded the provision of hospital accommodation to be used on the possible appearance of

cholera, had been taken into consideration by most of the Boards of Guardians in Ireland, in pursuance of circulars issued from the Commissioners' Department; and the Commissioners further observed that as the Unions, with very few exceptions, were each provided with an hospital for the reception and treatment of dangerous contagious disease, the additional accommodation likely to be wanted would not probably be considered, in the first instance, to be very extensive. The ultimate extent would, of course, depend upon the progress of the disease, if it should unfortunately break out.

The Commissioners also pointed that a very small proportion of the fever hospital accommodation being then occupied by fever patients, it would be a great protection to the inhabitants of the central town of the Union, and to the inmates of the workhouse itself, if a ward on each side of the detached building used for fever patients, were appropriated to the reception of cholera patients, brought either from the workhouse or from elsewhere; but in no case should cholera patients be introduced into the same wards where patients suffering from other diseases were under treatment, or into parts of the building occupied by healthy inmates. Within the workhouse itself, however, it would be found most useful to set apart one or more rooms for the separate treatment of inmates who are known to be affected with diarrhea, such patients being required to keep their beds until perfectly recovered; or, on the case passing into cholera, to be removed, if practicable and with safety, to the cholera wards in the Fever Hospital.

They further observed that, so far as relates to the "dispensing of medical aid," the Guardians would find that the present regulations differ but little from those of 1854, the Poor Law Unions and dispensary districts affording, as then, an organization which is very readily adapted, with some modifications, to the prevention of the spread of cholera, and to the effectual treatment of that disease, and especially of the premonitory symptoms which usually precede its attacks on individuals, the proper treatment of which in time has the effect of preventing its further development.

Under the Medical Charities Act, medical relief is obtainable only for the poor by means of tickets, signed by certain authorized persons; but by Paragraph V. of the Order, the entire population, in places where cholera prevails, is at once entitled to medical advice and medicine, free of charge, in every case of complaint of the bowels.

There are, however, in the recent Act—"The Sanitary Act,

1866"—some new powers conferred on Boards of Guardians, the exercise of some of which is regulated by certain provisions of the order.

The first of these is the new power given for the purpose of disinfecting infected clothing, bedding, and other articles. Where the ordinary disinfectants are not sufficient, and the use of great heat is necessary to disinfect such articles thoroughly, the Guardians are authorized by this paragraph to incur the expense of a hot-air room, with the proper apparatus and attendance, to disinfect by heat any articles brought for the purpose, free of charge.

By the second branch of the same regulation the Guardians are required to provide for persons afflicted by, "*or threatened with cholera,*" all such medical aid and such accommodation as may be required. These are the words of the Diseases Prevention Act; and it is observable that in the regulations issued by the Lords of the Privy Council in England, they are distinctly construed as including a power to provide accommodation for the friends of persons who have suffered cholera, so as to enable healthy occupants of infected houses to be removed to a temporary place of refuge until the premises have been thoroughly purified and disinfected.

In virtue of these provisions the Commissioners stated that they understood that, in the parish of Liverpool, a house of refuge was provided for such parties at the expense of the poor rates.

The third branch of the regulation relates to the establishment of a system of visitation from house to house, to be conducted by a staff of qualified practitioners and assistants.

As the operations required by this paragraph may be so carried out as to involve considerable expense, the Guardians were informed that these several requirements are limited to the case where cholera has been certified to prevail as an epidemic. The Guardians, however, possess the power to exercise the same functions under all circumstances during the time for which the Order in Council continues in force.

The Commissioners having stated that "The Sanitary Act, 1866," conferred upon them other powers which would be the subject of further communication, they thought it right, however, at once to apprise the Guardians that they had authority, complete and permanent, to appoint and pay from the poor rates one or more sanitary inspectors or inspectors of nuisances, for those portions of the union which are under their jurisdiction as the nuisance authority.

The following are the principal passages appearing in the order of the 25th August referred to. Their importance will justify their insertion, together with the form of notice alluded to in the order.

Under the first head,

Preliminary.—That the Guardians of the Union shall, at their first weekly meeting after the receipt of this order, make such preliminary arrangements as may, if sudden need shall arise, enable the regulations to be carried into immediate effect; and shall take steps to secure possession of such buildings or apartments as may be used, if necessary, as cholera hospitals.

Under the second head,

When Cholera is in a Union.—The Commissioners directed the formation of sanitary committees, and that the medical officers, relieving officers, and wardens within each district should aid the Guardians of the Union.

That the medical officers of the several dispensary districts shall receive extra remuneration for their attendance on cholera patients, and that every such medical officer shall give immediate attendance and medicine to all persons within his district complaining of diarrhea, looseness of bowels, or cholera, without requiring the production of a ticket for medical relief or attendance; and shall give daily attendance at the dispensary of the district at such hours as the committee shall direct.

That each sanitary committee shall hold a meeting once in each week, on the day before the meeting of the Board of Guardians; and an extraordinary meeting may be convened, in case of emergency, on any other day, by the medical officer of the district, or certain members of committee.

That every medical officer shall lay before the sanitary committee of the district, at each weekly meeting thereof, a statement showing in the separate columns the number of cases treated by him during the preceding week, with the result thereof. This return to be forthwith communicated by the sanitary committee to the Guardians of the Union, and the Clerk to the Guardians shall forthwith transmit to the Commissioners a summary of such returns. The medical officers are also required to make to the Commissioners a daily return of the cases of diarrhea and cholera occurring in their districts.

The Board of Guardians are required to post up in all public places throughout the union a notice stating the situation of the dispensary, the name and residence of the medical officer or officers

thereof, and recommending all persons to obtain medical advice who may be affected.

The Board of Guardians of the Union, and the sanitary committee of each dispensary district, in which any poor persons may be attacked with diarrhea or cholera, are required to cause the dwellings in which such persons may have been seized with disease to be thoroughly cleansed, purified, and disinfected, and all nuisances to be removed therefrom, and if necessary at the charge of the rates of the electoral division in which the dwellings may be situated.

In every dispensary district in which cholera shall be certified by the medical officers to prevail as an epidemic, the Guardians of the Union containing such district shall, for the purpose of thoroughly disinfecting clothes, bedding, or other things requiring a process of disinfection by means of heat, provide a proper chamber, with suitable apparatus, to which the relatives of all persons who have suffered from cholera may bring such clothes, bedding, or other things, for the purpose of being so disinfected; and in every such district the Guardians shall provide such medical aid and such accommodation for persons afflicted by or threatened with cholera as may be required; and shall likewise provide for the visitation from house to house of the inhabitants of such district, by employing and providing with all requisite medicines a sufficient number of qualified medical practitioners and assistants to make such visitation daily in the district, and to supply remedies to persons found to be suffering from cholera or diarrhea, as the case may be.

In the event of the fatal termination of any case of cholera in the dwelling of any poor person, the body of the deceased person shall be removed for interment as speedily as may be; and if, from the poverty of the occupiers of any such dwelling, they should be unable to provide for such interment, the Board of Guardians are authorized to defray the expense necessarily incurred for this purpose, and to charge the same on the Rates of the Electoral Division.

If any Board of Guardians shall be informed that cholera or choleraic diarrhea exists, or within three days previously has existed, in any ship or vessel, not belonging to Her Majesty or any foreign Government, which may be lying within their Union, they shall cause the same to be forthwith visited, inspected, and otherwise dealt with, according to the circumstances of the case, as if it were an inhabited house on shore, and shall give all such medical and other directions in reference to the persons in such vessel or

ship as shall be requisite for preventing the spread of the disease, and for the disinfection or disposal of any things which may be infected or may have been exposed to infection, subject always to the provisions of any order of Council issued under the quarantine laws for the time being in force within such Union.

The Poor Law Commissioners in this order authorized and required the Board of Guardians of each Union to do all acts, matters, and things necessary for superintending and carrying into execution the directions and regulations made by their Form of Notice.*

In addition to the foregoing instructions the Commissioners, on the 5th December last, addressed the Guardians of each Union on the importance of making permanent appointments of Inspectors of Nuisances or Sanitary Inspectors. They pointed out that the provisions of the Sanitary Act are not directed against cholera alone, but against every description of dangerous contagious disease, especially the more fatal kinds of fever, which, although not then epidemic, are always prevailing more or less in the country with fatal effects, and may at any time become epidemic.

These diseases are promoted in the same way as cholera, by the impurity of the air, more especially of that within the dwelling-house, and by the use of impure water, unwholesome food, and other like causes.

* PUBLIC NOTICE.— —Dispensary District. The Dispensary situate at—, is open, and the Medical Officer attends thereat, from—o'clock to—o'clock, daily. The Medical Officer may also be consulted at his own residence daily, from—o'clock to—o'clock.

The residence of—the Medical Officer, is at—.

If any person be attacked by *diarrhea or looseness of bowels*, however slight, *whether with or without pain*, let him apply WITHOUT A MOMENT'S DELAY (*no ticket or recommendation being necessary*) at the Dispensary, or at the Medical Officer's residence, as above stated, where medical relief will be given with the least possible delay : but,

In case medical advice be not at hand—or if in addition to looseness of bowels or diarrhea, any person be attacked with vomiting, cramps, or great weakness—let him go at once to bed, wrap himself in warm blankets, roll a swathe of warm flannel, sprinkled with hot spirits of turpentine or whiskey, closely round the body, extending from the chest to the hips, and take a teaspoonful of brandy or whiskey in a little water, with fifteen drops of laudanum, repeating it every hour if the attack be not checked, until a third dose has been taken. He ought not to venture further in the use of laudanum without medical advice.

If any person be affected with vomiting, purging, or cramps, and in consequence be unable to go out, let him direct some person to apply—either at the Dispensary, if within the hours above named for attendance at the Dispensary—or at the Medical Officer's residence, if at any other time, or when the Dispensary is not open ; giving the name and residence of the patient, and requesting an immediate visit from the Medical Officer.

The Commissioners remarked that the removal of nuisances, the maintenance of proper drainage, the supply of pure water to the population of towns and villages, and the prevention of overcrowding in dwelling-houses, are objects which the Legislature has determined shall henceforward be continuously carried out for the security of the public health, and has, therefore, created permanent powers and imposed permanent responsibilities for that purpose; and there is no Union in Ireland in which, henceforth, it will not be necessary for the Guardians to employ at all times one or more Inspectors of Nuisances, in order to enable them to carry out continuously and permanently these objects of the Legislature.

The office of Inspector of Nuisances will necessarily vary much as to the extent of its duties, and the amount of remuneration for their performance according to the circumstances of the district. In some cases it may be proper to employ a person devoting himself wholly to the office; in other cases, especially in rural districts, Relieving Officers, or other Officers under the control of the Guardians, can be invested with the duties; but in the opinion of the Commissioners all territory which is within the district of the Guardians, as a sewer or nuisance authority, should be under some person having authority to act as an Inspector of Nuisances, and responsible for reporting to the Guardians every case requiring any exercise of their powers either as sewer or nuisance authority.

There are many clauses in this useful Act worthy of being more prominently noticed, respecting the extension of quarantine laws to coasting vessels in the United Kingdom, and the extension of the jurisdiction of nuisance authorities to ships. The important powers entrusted to the Poor Law Commissioners, of inquiring into public health; the disinfection of houses, clothes, and carriages; carriage of persons suffering under infectious diseases in public conveyances; provision of places for the reception of the dead; power of cleansing and covering open ditches. Sale of unwholesome meat, noxious trades and manufactures, overcrowding of dwellings; regulation of lodging-houses and cellars; removal of manure in stables and mews. Baths and wash-houses, sewerage, power of sewage authorities to construct waterworks, and supply water to towns and villages, and for baths, trading and manufacturing purposes.

Many of these enactments are in full operation, and the benefits to be derived from others depend upon the views taken by the local authorities and officers of their duties and responsibilities. If the representatives of the rate-payers, at Boards of Guardians and

Corporations, do not carry into effect their important trusts, the remedy is in the hands of their constituents, who have been wisely allowed the opportunity of periodically returning them. To the rate-payers of this country the largest amount of representation, responsibility, and freedom has been confided.

Although ardent and enthusiastic sanitary reformers have desired that the unlimited powers and jurisdiction of a Haussmann should be placed in the hands of the central authority, they should remember that the highest authority—John Stewart Mill—has laid down, in his celebrated *Essay on Liberty*, that “to secure as much of the advantages of centralized power and intelligence as can be had without turning into governmental channels, too great a proportion of the general activity, is one of the most difficult and complicated questions in the art of government.” He believes that the practical principle in which safety resides, may be conveyed in these words:—“The greatest dissemination of power consistent with efficiency; but the greatest possible centralization of information, and diffusion of it from the centre.” He adds that the central organ should know all that is done, and its special duty should be that of making the knowledge acquired in one place available for others. Emancipated from the petty prejudices and narrow views of a locality by its elevated position and comprehensive sphere of observation, its advice would naturally carry much authority; but its actual power should, he conceives, be limited to compelling the local officers to obey the laws laid down for their guidance. For the violation of rules, they should be responsible to law, and the rules themselves should be laid down by the Legislature; the central administrative authority only watching over their execution; and if they were not properly carried into effect, appealing, according to the nature of the case, to the tribunals to enforce the law, or to the constituencies, to dismiss the functionaries who had not executed it according to its spirit. “Such, in its general conception, is the central superintendence which the Poor Law Board is intended to exercise over the administrators of the poor-rate throughout the country.” “A government cannot have too much of the kind of activity which does not impede, but aids and stimulates individual exertion and development. The mischief begins when, instead of calling forth the activity and powers of individuals and bodies, it substitutes its own activity for theirs; when instead of informing, advising, and, upon occasion, denouncing, it makes them work in fetters, or bids them stand aside and does their work instead of them.”

PART III.

MEDICAL MISCELLANY.

Reports, Retrospects, and Scientific Intelligence.

TRANSACTIONS OF THE MEDICAL SOCIETY OF THE KING AND QUEEN'S COLLEGE OF PHYSICIANS.

Special meetings of this society were held on 27th March, and 4th and 5th April, to receive and consider reports from the hospitals in which cases of cholera were received during the late epidemic.

ABSTRACT OF REPORTS ON THE LATE EPIDEMIC OF CHOLERA.

MEATH HOSPITAL.

Short Abstract of Facts Connected with the Epidemic of Cholera. By
GEORGE ROE CARTER, late Resident Pupil. (On the part of himself
and other Assistants).

1. *Time occupied.*—The first patient was admitted on the 8th of August into the cholera wards of the Meath Hospital, between which date and the 14th of October 116 patients were admitted, all of whom were under the supervision of Dr. Hudson. An interval of about six weeks occurred between the closing of the wards on the 20th of October, and opening of the sheds, which were opened on the 1st of December, and closed on the 28th of the same month; during that time fourteen cases were admitted into the sheds, and treated according to Dr. Stokes' directions.

2. *Accommodation provided.*—The wards of the Meath Hospital for the reception of such cases were first opened under very unfavourable circumstances, which, no doubt, is well known to a great number of the profession, inasmuch as they were quite inadequate in size, situation, ventilation, and other common necessities, which are of such vital importance, not only for the welfare of the patients, but even for the attendants.

The cubic space of the wards are as follows :—

Female ward, 3,432 feet ; male ward, 4,302 ; they contained six beds each, which only allows 572 cubic feet for each female patient, and 717 for each male, giving an average of $644\frac{1}{2}$ cubic feet for each, without any current of air. The sheds which were erected are in every respect well adapted for the requirements of such patients.

3. *Stage of disease on admission.*—Out of the 116 cases admitted into the above named wards which were treated by Dr. Hudson—five were in the premonitory stage, 108 in collapse or approaching it, and three in consecutive fever ; of the fourteen cases which were admitted into the sheds and treated by Dr. Stokes, three were in the premonitory stage, nine collapse, or approaching it, and two in consecutive fever.

4. *Mortality at different periods and different ages.*—From the 8th August to the 1st of September the mortality was 48·9 per cent., and from the latter date to the 20th October raised ~~to~~ 54·5 (the increase of which we consider was due to the overcrowding of the wards), and to the condition of the patients on admission, as the earlier cases were more amenable to treatment, while, as the epidemic advanced, the disease assumed a more malignant type, which was probably aggravated by the crowding in our small wards. In December, on opening our large and airy sheds, it went down again to 42·8 per cent., averaging on the whole 51·5 per cent. Over twenty of those patients died within five hours after admission, some in a quarter of an hour, others in from half an hour to two hours. The mortality in children and adults was much under that of the aged, and particularly those whose constitution had been broken down by dissipation, few, if any of them, recovered.

5. *Modes of treatment pursued, varied according to the stage, as follows:—*

(a.) In premonitory diarrhea and early stage, in two cases castor oil was given, but with discouraging results. Acetate of lead with small quantity of opium, sulphuric acid, and chalk mixture, with kino and catechu succeeded in a number of instances ; the vomiting was checked in some cases by freshly prepared charcoal, in a few by bisulphite of soda, but with most effect by creosote and acetic acid, which was subsequently prescribed by Dr. Stokes. We also found a solution of camphor and chloroform useful in cramps of the stomach, particularly so when combined with capsicum, and the inhalation of chloroform most effectual in allaying cramps in some bad cases ; in addition to those internal remedies, hot stupes of mustard and turpentine were applied, and friction of the surface and extremities with the hands ; flannel bandages being applied after friction. Brandy was given freely, and ice *ad libitum*, the latter of which was of much use in allaying thirst and checking vomiting.

(b.) In collapse or approaching it, the patient was enveloped in a blanket wrung out of hot water and mustard, and sprinkled with turpentine, over which a number of dry ones were put, removed when it got

cool, and repeated if necessary; this we found to be most efficacious in rousing the patient and raising the temperature of the body, after which mode of packing the radial pulse, which was before it imperceptible, invariably returned, and the patient expressed himself as being much better. We have also tried, with some advantage, Sir D. Corrigan's button-shaped cauter, heated by boiling water, and applied over the vagus, and on either side of the spine, which would arouse the patient greatly for the time, though he frequently relapsed into his former condition. In addition to those external applications, calomel and bismuth from gr. $\frac{1}{4}$ to $\frac{1}{2}$ gr. of the former, to gr. v. of the latter were given every hour, until the secretion of bile and urine was restored; the dose of calomel was subsequently increased (to gr. v. followed by one grain every hour) by Dr. Stokes, also with good results; camphor and chloroform, and the inhalation of chloroform were also employed in this stage of the disease for the relief of cramps. At the suggestion of Dr. White tinct. of cannabis indica was extensively tried (in 20 to 30 drop doses) as a stimulant, in some cases with apparent benefit; brandy was freely given also in this stage of the disease. Seven cases were treated by calabar-bean at the request of Dr. Mapother, which Dr. Mapother reported in *The Medical Press and Circular* of the 12th of September; in these seven cases three proved fatal, and with one or two of those who survived we were obliged to discontinue the use of the drug, and put them on calomel, on which treatment they speedily recovered. In some of those cases it produced dysenteric stools, and contraction of the pupil with the cornea slightly injected. (As the number of cases treated by the drug were insufficient to test its value in this disease, we cannot either condemn or recommend its use; but we are of opinion that the results from its more extensive trial would not have been so favourable as those of the calomel treatment). Two cases were treated by Dr. Stokes, by the injection of salines into the veins, which proved fatal (but as they were previously treated by calomel, and the number not sufficient to test its value, we cannot say anything in favour of it or otherwise).

Stage of suppression of urine, and consecutive fever.—(c.) For suppression of urine the patient was cupped over the lumbar region, and 3 or 4 $\bar{z}$ removed, after which a hot bran poultice was applied to the feet, and diuretics administered. In several instances the cupping was repeated with great advantage, and we have succeeded in bringing on the flow of urine in a good many cases, when complete suppression of that secretion had existed for over forty-eight hours, and even from patients who were far advanced in uremia by those measures; calomel and bismuth was also given in this stage of the disease as before, but stimulants were not administered so freely. In the consecutive fever, if the evacuations from the bowels were bilious and copious, the calomel was either discontinued

altogether or given in small doses at long intervals; if the pulse was strong and regular, tongue moist and rather clean, no gastric irritation or delirium, the patient got a moderate quantity of brandy or wine, chicken broth or weak beef-tea, bread and milk or tea and ice *ad libitum*. In the advanced stage of uremia, when head symptoms were present, the characteristic odour from the patient, with complete suppression of urine, we have seen the best results follow, repeated cupping over the loins with the administration of diuretics, the shaving of the head and blistering the nape of the neck, and the application of leeches to each mastoid process, with a calomel and rhubarb purge when there was no motion of the bowels for a few days. Such were the modes of treatment adopted during the late epidemic by Dr. Stokes and Dr. Hudson, and if time or space would admit, we could bring forward a number of important cases which were successfully treated. During the whole epidemic only two cases occurred in the hospital, which was in the interval when no cholera cases were in the wards, or had been for ten days previous. One of those patients was convalescent from typhoid, and died in nine hours' illness, the other was in the thirteenth day of typhus, with high nervous symptoms, and died in about twelve hours' illness. The night nurse and washerwoman attending on the cholera wards were attacked; the former made a wonderful recovery, but the latter died in less than twenty-four hours' illness. We also had a case associated with pregnancy, who was admitted in a very precarious state; the woman was six months pregnant. The treatment as in other cases was adopted, and the patient left hospital perfectly well, without any sign of abortion.

HOUSE OF INDUSTRY HOSPITAL.

Summary Report on the Cases of Cholera Admitted to the Hardwicke Hospital, 1866. Collated by Mr. J. ADAMS CLARKE, Clinical Clerk. Edited by DR. LYONS.

During this epidemic a total of 277 cases were admitted into the cholera wards, and no case of cholera was refused admission; several were admitted which had failed to procure admission elsewhere. From these cases were rigidly excluded, by the clinical physicians, all instances of vomiting and purging, with or without cramps, which did not strictly correspond to the true type of Asiatic cholera. There were thus recorded of

True cholera, . . .	193 cases, of whom 128 died.
Diarrhea, . . .	68 " " " 1 "
Vomiting and cramps, 16	" " " None "
277	129

Of diarrhea, including choleraic diarrhea, 68 cases were admitted, of

which the first was taken in on June 25th, and the last on December 3rd. Occurring during the prevalence of a cholera epidemic, these cases, it is highly probable, belonged to the epidemic constitution then prevailing; only one case proved fatal. It occurred in the person of a man, aged forty-five, who was admitted on the 6th of August, and died on the 10th. Prior to the 25th June no case of diarrhea had been admitted into the Hardwicke Hospital for a period of six months.

Cholera.—Of undoubted cases of true cholera 193 were admitted, of whom 128 died. The first case occurred in the person of a girl aged seven (Susan Carleton), who was admitted on the 22nd of August: she had lived in Church-street, 127; she died on the 23rd of August. The last case of death from cholera occurred on the 5th December, 1866; but the last case of cholera disposed of in hospital was discharged cured on the 28th December, 1866.

The following table exhibits the actual number of cholera cases by sexes and ages:—

Admissions by ages			Under						Over	Total Deaths	
			5	10	20	40	50	60	60		
Males	-	-	7	9	17	26	11	3	7	80	48
Females	-	-	6	9	19	41	12	13	13	113	80
Totals	-	-	13	18	36	67	23	16	20	193	128

Last case discharged cured 28th December, 1866.

The largest number of admissions occurred during week ending 27th October—11 males, 12 females; total, 23.

The largest number of deaths during the same week (27th October)—4 males, 11 females; total, 15.

The geographical distribution of the above cases was as follows:—

From N. side of Dublin,	-	-	85, i.e., north of the Liffey.
From S. „ „	-	-	105, i.e., south of the Liffey.
From Arklow, Wicklow (Dublin Bay),	-	-	1
From Kingstown, Co. Dublin,	-	1	.
From Westport, Co. Mayo,	-	1,	(Guard in M. G. W. Railway got ill on way).
Total,	-	-	193

The admissions per month were as follows:—

	July	Aug.	Sep.	Oct.	Nov.	Dec.
Males	-	1	10 ₈	21 ₁₄	24 ₁₅	21 ₁₃
Females	-	-	11 ₆	24 ₁₄	39 ₂₉	33 ₂₄
Totals,	-	1	21 ₍₁₄₎	45 ₍₂₈₎	63 ₍₄₄₎	54 ₍₃₇₎
						(9 ₅)
						Total, 193.
						(Deaths, 128.)

N.B.—The small figures indicate the deaths.

Diarrhea, including choleraic diarrhea—Total, 68, including 1 death.

First case admitted June 25th.

Last „ „ Dec. 3rd.

The next table exhibits the mortality for sexes and ages respectively:—

Deaths for ages			Under						Over	Total.
			5	10	20	40	50	60	60	
Males	-	-	4	6	8	15	10	2	7	52
Females	-	-	4	7	7	25	11	10	12	76

The excessive mortality of females of the ages of 40, 60, and upwards, at once strikes the eye.

In the subjoined table will be found the per centage mortality of the sexes, ages, and for the months of the epidemic:—

TABLE OF PERCENTAGE MORTALITY.

The percentage mortality in the total of true cholera cases was 66·3 per cent.

For males the mortality was - - - - - 60· „

For females „ „ - - - - - 70·8 „

FOR THE SEVERAL MONTHS THE PERCENTAGE MORTALITY WAS :

Aug.	Sept.	Oct.	Nov.	Dec.
66·6	62·2	69·84	68·5	55·5

FOR THE SEVERAL AGES AND SEXES THE PERCENTAGE MORTALITY WAS :

Deaths for ages			Under						Over.
			5	10	20	40	50	60	60
Males	-	-	57·14	66·6	47·	57·69	90·9	66·6	100·
Females	-	-	66·6	77·8	36·4	60·9	91·66	76·9	92·3

Subjoined is a tabular view of the duration of the fatal cases in hours prior to their admission to hospital:—

FATAL CASES—DURATION OF DISEASE BEFORE ADMISSION TO HOSPITAL.

Admitted dead	Under 1 hour	Under 2 hours	Under 3 hours	Under 6 hours	Under 12 hours	Under 24 hours	Under 48 hours	Under 72 hours	Under 96 hours	Under 5 days	Over 5 days	Not known
1	2	3	3	16	38	22	12	5	7	5	8	6

128

The next summary shows the duration in hours of the fatal cases in hospital:—

FATAL CASES—DURATION OF DISEASE IN HOSPITAL.

Brought in dead.	Under 1 hour	Under 2 hours	Under 3 hours	Under 6 hours	Under 12 hours	Under 24 hours	Under 36 hours	Under 48 hours	Under 72 hours	Under 96 hours	Under 10 days
1	1	2	2	6	28	50	3	13	7	4	10

90 died within 24 hours.

16 died within
48 hours.

Total 128 deaths.

We annex a summary of the results of various plans of treatment by:—

		Deaths.	Recoveries
Emetics	- - - - -	—	—
Purgatives	- - - - -	—	2
Astringents	{ lead and opium -	—	—
	{ catechu, &c. -	15	18
	{ chalk, &c. -	—	—
Calomel,	- - - - -	31	16
By stimulants	{ chl. ether, sp. am. -	40	13
	{ brandy, &c. -	—	—
Without stimulants	- - - - -	—	1
By special treatment—as white of egg	- - - - -	8	2
Calabar bean	- - - - -	—	1
Camphor and chloroform	- - - - -	11	3
Camphor, capsicum, and creosote	- - - - -	8	4
Warm bath	- - - - -	—	1
With milk	- - - - -	—	—
Diuretics	- - - - -	—	1
No entry	- - - - -	13	13
Permanganate of potash	- - - - -	1	—
Ice, brandy, &c.	- - - - -	1	—
Total		128	75

As to treatment it is to be observed that none of a special character was exclusively adopted; and each case was dealt with according to the symptoms which were predominant. A very large number of the cases were, as already stated, in collapse on admission, or passed into that stage almost immediately, 90 deaths out of 120 having occurred within 24 hours after admission to hospital. In this condition the means employed were those calculated to restore the circulation—free stimulation, friction to the surface with the hand or with warm flannels—hot stupes, with or without mustard, turpentine, &c.—hot dry flannels were wrapped round the body. Amongst other stimulants, camphor dissolved in chloroform was freely given, also a pill containing camphor, capsicum, and creosote. Stimulants of an alcoholic nature were given largely diluted. Cold drinks were given without any restriction when the patient desired them; in one instance the patient would take nothing but scalding hot water; white of egg dissolved in water, one egg to the pint, was given as a bland and agreeable drink; ice was freely supplied. In about 33 cases astringents were the medicines chiefly employed, besides the general measures before stated. Of these the deaths were 15 to 18 recoveries. In about 47 cases calomel in small doses was given as the principal remedial agent, and of these 31 died and 16 recovered. Lini-ments of turpentine and chloroform, and also of belladonna and aconite were largely used, and were found effectual in allaying cramps. Secondary fever occurred in a certain proportion of cases only, marked

by suppression or diminished secretion of urine. In several of these cases nitre, calomel, dry cupping to the loins, the prolonged use of the warm bath, and diuretics were found of essential service.^a

The following is a brief summary of the *post mortem* appearances:—

GENERAL SUMMARY OF POST MORTEM APPEARANCES.

1. Body generally—Rigor well-marked; lividity diminished; temperature raised, as compared with that before death.
2. Brain—Healthy.
3. Spinal Chord—Healthy.
4. Ganglionic centres (solar plexus and semilunar ganglia)—Healthy.
5. Blood—Thick and tarry.
6. Heart—Right chambers loaded; pulmonary artery contained coagulum.
7. Lungs—Occasional congestion; no constant condition.
8. Stomach—a washed appearance; but varied with ingesta, taken in before death.
9. Intestines—A general washed appearance; pale pink colour; sago-grain appearance of minute glands.
10. Liver—No marked appearance noticeable.
11. Spleen—No special characters.
12. Kidneys—Rather bloodless; and in cases of prolonged life with uremia, some congestion with infarction of tubules.

There were 26 persons, 4 males and 22 females, employed in the Hardwicke Hospital during the cholera period; 4 nurses and 2 ward-maids were in constant attendance on the cholera patients; all the others were in close proximity, and frequently assisted in carrying in patients, &c.; 5, exclusive of the laundry-superintendent, were constantly engaged in washing the clothes of the cholera patients; of all of them, but one, a laundry-maid, took cholera, and she died of it. She was some hours ill with cholera in the sleeping room of the laundry-maids, who were all in close attendance upon her; 4 physicians, 4 clinical clerks, 2 temporary do., and a class averaging 20 per day were in daily attendance; one clinical clerk (Mr. Henry) exhibited cholera, but recovered. In all—4 physicians; 4 clinical clerks; 3 temporary do.; 1 steward and paymaster; 1 registrar and accountant; 20 pupils (at a minimum); 26 domestics and superintendents; 1 diet clerk.—Total, 60.

These persons were exposed to the full influence of the disease, of whom two only exhibited it, and one of whom only died.

The cholera wards of the Hardwicke Hospital are two of the ordinary fever wards; they are under the same roof as the other wards, and all the wards open upon a common well-stair-case and central hall, and it is impossible to conceive that in changing and varying winds admixture of the atmosphere of the cholera wards with that of the other wards did not frequently take place.

^a This paragraph has been supplied by Dr. Lyons for the present publication.

The fever wards were occupied by ordinary cases during the cholera period to the total number of 428; of these five patients only exhibited cholera.

I. FEVER PATIENTS IN HARDWICKE DURING CHOLERA EPIDEMIC, FROM JULY 26TH TO DECEMBER 16TH, 1866.

July	26th to 31st,	-	-	-	-	-	10 patients.
August	1st „ 31st,	-	-	-	-	-	92 „
Sept.	1st „ 30th,	-	-	-	-	-	81 „
Oct.	1st „ 31st,	-	-	-	-	-	107 „
Nov.	1st „ 30th,	-	-	-	-	-	67 „
Dec.	1st „ 28th,*	-	-	-	-	-	71 „

Total 428 patients.

This total number of 428 includes simple typhus and typhoid fever, small-pox, scarlatina, and measles.

II. FEVER PATIENTS WHO TOOK CHOLERA IN THE HOUSE.

- | | |
|--|---------|
| 1. <i>Edward Corcoran</i> , admitted with fever, 26th July; got cholera August 30, 1866. | } Died. |
| 2. <i>Thomas Berry</i> , admitted with fever 28th August; got cholera. | |
| 3. <i>Ellen Brennan</i> , admitted with fever 9th October; got cholera. | |
| 4. <i>Mary M'Mahon</i> , admitted with fever 10th October; got cholera. | |
| 5. <i>Margaret Leary</i> , admitted with fever 20th October; got cholera. | |

Summary.—Total fever, &c., cases in Hardwicke during the period commencing July 26th and ending December 28th - - - - - 428
Total number of these cases that took cholera during this period - - - - - 5

It will thus be seen that of a total of 60 persons in the establishment, and 428 patients in the Institution, in all 488, only 7 exhibited cholera, being in the proportion of 1.43 per cent.

Five cases of cerebro-spinal arachnitis occurred in the sequela of cholera. In no single case was true cholera typhoid developed as a sequel of cholera.

MOUNTJOY MALE GOVERNMENT PRISON.

Report on the Cholera Outbreak at the close of the year 1866. By
DR. ROBERT M'DONNELL.

A detailed account of the circumstances connected with this outbreak will, I conceive, have considerable interest in the eyes of medical men.

The facts have a scientific value on account of the neatness, precision, and accuracy with which they can be ascertained within the walls of such an institution as a prison. Let me state, that I do not myself advocate any theory on the subject of the propagation of malignant cholera. I do not doubt that the disease is capable of being communicated from the sick

* The last cholera patient was discharged cured December 28, 1866.

to the healthy; but it appears to be equally certain that there are cases where malignant cholera cannot be logically traced to this origin. I shall confine myself to a simple statement of facts.

The Mountjoy Prison stands in a salubrious situation. Since it was opened for the reception of prisoners in the year 1850, the health of the convicts received into it has been such as to contrast favourably with other similar institutions. There has never been any prevalence of diseases, such as arise from imperfect sewerage; it is built on a heavy blue clay soil, and on a sloping ground, so that within the prison walls there is a fall of twenty feet from the upper to the lower part. There is a well of water (not used for the supply of the prison) about the centre of the grounds; this well is ninety-five feet deep, and the water is tolerably strongly chalybeate. The prison is built upon what is known as the Pentonville plan, that is four arms radiating from a centre. Each of these arms is known as a division (A, B, C, D divisions), and consists of corridors with cells on each side. There are three tiers of cells, one over the other. There are basement stories under each division except A. These basements contain store-rooms and workshops, but no cells. Each cell contains a little over eight hundred cubic feet of space, and there is an arrangement for ventilation (independently of the window), similar to that in Pentonville prison, where it is calculated that the air is renewed at the rate of about two thousand cubic feet per hour.

There is a water-closet in every cell, well trapped and supplied with an abundance of water. At the lowest extreme of the prison grounds there are three large underground sewage tanks, in which the more solid part of the sewage accumulates, and is used from time to time as manure; the liquid sewage flows off by a large sewer.

The canal of the north side of the city of Dublin has two branches in the angle between which the prison stands, the water in these branches is on a higher level than the ground on which the prison is built.

During the early part of December, 1866, the health of the prisoners was as good as it had been at any time for ten years before. On Saturday, December 22nd, 1866, there were 288 prisoners in the prison (145 convicts, and 143 untried political prisoners), there were only five sick in hospital. On the forenoon of Sunday, the 23rd December, five cases of malignant cholera occurred, of which three died before many hours. On the 26th two other cases were admitted to hospital, and on the 27th two more—of these one died; no case has occurred since then. In all there were nine cases of malignant cholera, of which four died. Upon the day following the first appearance of cholera, sixty-four cases of diarrhea were reported,^a and placed under treatment—twenty-one convicts, forty-three among the untried political prisoners.

^a Immediately on the first appearance of the disease each warder in the prison was directed to go round each prisoner in his charge and enquire whether he was suffering

As to the introduction of this disease from without by the warders or prison officers, the following are the facts :—

No one of the warders or other officers had had cholera, neither had there existed any cholera among their families.

Mr. Ward, the resident apothecary, had not seen any case of cholera for years. I had not myself been in contact with a case of cholera since the beginning of October (nearly three months before).

The prisoners attacked were not in communication with each other, or with the same warders. In short, I have been wholly unable to trace this outbreak to any communication between the sick and healthy. None of the warders, officers, or prisoners who were in attendance on those ill of cholera took the disease. It has been surmised that the disease may have been propagated from the Mater Misericordiæ Hospital, which is distant from the prison some 300 paces. I have learnt that there was no case of cholera in this hospital at the time that the disease broke out in the Mountjoy Prison ; the last case admitted to that hospital was taken in on December 17th, and died on the 18th ; for ten days before that there had been no case of cholera in this hospital.

Water Supply.—The water used in the prison is drawn from the reservoir from which the north side of the City of Dublin is supplied ; it is conducted through iron pipes, and passing through a filter of gravel is received in a large supply tank placed at the highest part of the prison ground, remote from, and about twenty feet higher than the sewage tanks. From the supply-tank it is pumped by engine to the cistern on the top of the prison. As it enters the supply-tank rather slowly through the filtering apparatus, it happens that the engine pumps it out more rapidly than the water flows in. The result is that at about four o'clock every day, the supply-tank is pumped nearly empty, and thus every twenty-four hours there is an entirely fresh supply of water drawn.

The female prison adjoining is supplied by water from the same tank ; no case of cholera occurred in the female prison. I examined the water, and have found it limpid and colourless. It is a water of as good quality as any supplied on the north side of Dublin ; it is pleasant to drink, free from odour or taste, sufficiently soft, and containing some saline matter (magnesia and lime).

Food and Dietary.—The bread, soup, milk, oatmeal, stirabout, &c., used in the prison appear to me to be of good quality ; the steward and cook inform me that they consider the food supplied during the month of

from any bowel attack ; 64 cases were returned by the warders, and at once placed under treatment.

The outbreak commenced and terminated within a week. The nine cases of cholera all presented symptoms of collapse ; in one case only were the cramps severe ; in all there was the usual vomiting, purging, cold-blue extremities, husky voice, sunken eye, thirst, cold tongue, and breath, &c.

December of good average quality. The beef used for the soup, &c., is supplied at the contract price of 5½d per pound (exclusive of bone), mutton 8d. per pound (not exclusive of bone). Bread 2·6 pence per two pound loaf.

The cooking is performed by a steam apparatus, and is carried on in large cast iron boilers kept scrupulously clean.

The untried political prisoners are permitted to get their own food sent in by their friends if they please; some half dozen only availed themselves of this privilege: one of those (who was not making use of any of the prison food at all) was among those attacked with bad choleraic diarrhea.

Among the other prisoners two distinct dietaries were in use, as follows:—

DIET ON SATURDAY, DECEMBER 22ND, 1866.

	Untried prisoners and working convicts	Convicts of probationary class
Breakfast . . .	bread and coffee,	stirabout and milk.
Dinner . . .	{½lb. beef, broth and}	bread and milk.
Supper . . .	{ 2lbs. of potatoes, }	bread and milk.
	bread and milk,	

Cholera appeared simultaneously among the persons on these distinct scales of diet. As some have supposed that the milk was the special article of diet at fault, I have examined carefully into the circumstances concerning it. The milk supplied by the predecessor of the present contractor was of bad quality, it was supplied at the low figure 5½d. per gallon, it was frequently rejected, and finally the contract was broken. On September 6th, the milk contract was transferred to other hands at 10d. per gallon. Since then the milk supplied has been of good quality (it was, however, on one occasion, rejected October 5th, 1866).

I have frequently examined the milk, and have never found it to be adulterated with anything except water. The maximum of added water amounts to not more than 25 per cent. (usually much less than this), a dilution which I do not consider warrants the rejection of milk, inasmuch as the milk generally supplied throughout Dublin in private families is diluted to about this degree. In justice to the individual who at present supplies milk to this prison (and of whom, I may add, I know nothing), I feel bound to state that, in my opinion, the article furnished by him is good average milk.

Several of the prison officers from choice make use of this milk; from them I learn that they have had no fault to find with it—one of the prisoners who died of cholera had taken no milk the day before he was attacked, save the small quantity in his coffee which had been boiled.

TABLE of Cases attacked with Asiatic Cholera during the last Week of December, 1866.

Name of Prisoner	Reg. No.	Date of Reception in this Prison	Place whence he came	How long in the Cell in which his illness commenced	How long in this Prison	Number of Cell and Corridor §	Whether Premontory Diarrhea existed, and how long ?	Date of Admission to Hospital	Termination of Case
John K.	7238	April 27, 1866	Lifford Gaol, County Donegal	Nearly 8 months	8 months	C 2, 7 Cell	No premonitory diarrhea	Dec. 23, 1866	Death at 10 that night.
Wm. M.	Untried	Sept. 1, 1866	Kilmahnam Gaol	1 month and 27 days	4 "	A 2, 13 "	No premonitory diarrhea	" "	Death at 6 that evening.
J. M'C.	7255	July 9, 1866	Monaghan Gaol	2 months and 11 days	5 "	C 3, 37 "	Had diarrhea for 48 hours	" "	Death at 12 next day.
G. T.	6987	May 12, 1866	Spike Island Prison	4 months nearly	7 "	D 3, 45 "	Violent vomiting was the first symptom	" "	Recovery.
* J. H. C.	7045	July 13, 1865	Londonderry Gaol	12 days	5 "	D 2, 41 "	Diarrhea during night of 22nd	" "	Recovery.
J. S.	7229	April 12, 1866	Spike Island Prison	About 8½ mths.	8 "	D 2, 40 "	Diarrhea on the 24th, not checked by treatment	" 26, "	Recovery.
† A. L.	7230	April 17, 1866	Richmond Bridewell	About 1½ mths.	8 "	C 3, 32 "	First symptoms violent vomiting and purging	" "	Recovery.
John M.	7100	Nov. 4, 1865	Maryboro' Gaol	5 months and 20 days	13 "	D 1, 23 "	Collapse from the first; no premonitory diarrhea	" 27, "	Death at 11 on night of 23th.
‡ T. N.	Untried	Dec. 18, 1866	Clonmel Gaol	About 8 days	8 days	B 3, 18 "	Premontory diarrhea came on on the 25th; treatment did not check it, and vomiting supervened	" "	Recovery.

* During convalescence this patient was covered with a rash resembling measles.

† This patient was for 24 hours apparently hopelessly collapsed.

‡ This man had never, to his knowledge, been in contact with cholera. There had been no cholera in Clonmel for three months before his committal.

§ A. B. C. and D. indicate the wings of the prison radiating from a centre; 1 indicates the lowest story; 2, the second; and 3, the top. No case of cholera had occurred among any of the prison officers or their families. The outbreak terminated within one week from its first appearance. There were 64 cases of diarrhea reported on the first day of the outbreak; some of these were severe, and were attended with vomiting, but none are put down in this table save those who were in collapse.

Cases of cholera occurred in each wing of the prison, no wing escaped; with one exception all those taken ill of cholera were in the upper stories, four were in the highest story, four on the second, and one below.

I examined the closets in the cells which had been occupied by each case, and found that all were in good order.

None of the prisoners attacked had been under the depressing influence of any special punishment by curtailed diet or otherwise.

The prison faces south-west, and the Mater Misericordiæ Hospital stands 300 paces in front (that is south-west) of it. During the days which the cholera lasted, the wind blew from the south-west almost continually. On the night of the first appearance of the disease, the atmosphere was fully saturated with moisture—the wet and dry bulb thermometers stood equal. I subjoin a table (p. 473) giving some particulars concerning the individuals attacked. Happily the efforts made to prevent the spread were eminently successful.

Infected clothes were burned, incipient cases promptly attended to, and every part of the prison and hospital disinfected with carbolic acid and solution of sulphate of iron, which were thrown into the closets and sewers.

SIR P. DUN'S HOSPITAL.

Summary of Cholera Report. By E. W. COLLINS, A.B., Resident Medical Scholar.

Elizabeth Meyler, in a short time after the death of her husband from cholera, sickened, and was brought to Sir P. Dun's Hospital (Aug. 2nd, eleven a.m.) twenty-four hours and a half after being attacked, and died sixty-three hours and a half after admission, after an illness of eighty-eight hours.

This was the first case which sought admission into Sir P. Dun's Hospital.

There were in all 180 cases of cholera treated in this hospital, dating from August 2nd, 1866. Of these 180 cases, the particulars of 148 are as follows:—

Symptoms, &c., in 148 cases.	Number of patients thus affected.	Percentage of patients thus affected.	Number of patients not thus affected.	Percentage of patients not thus affected.
Purging	142	95·94	6	4·06
Vomiting	130	87·83	18	12·17
Cramps	84	56·75	64	43·25
Collapsed on ad- mission	74	50·	74	50·

Of these 148 cases 72 (48·64 per cent.) belonged to the male, and 76 (51·36 per cent.) to the female sex; 70 (47·29 per cent.) died, and 78 (52·71 per cent.) recovered. The average length of time which elapsed

between the commencement of the illness of each of these cases and their admission into hospital was 48·35 hours. Moreover, the entire duration of the disease in the cases of those who succumbed was, on an average, 79·34 hours. In other words, these patients lived, on an average, only 31 hours after they came into hospital. The order of constancy of the symptoms was, as may be seen, purging, vomiting, and cramps, the coefficients per cent. of each of these symptoms, respectively, being 95·94, 87·83, and 50·75. Diarrhea, therefore, was all but uniformly present. Of the few cases, altogether six in number, in which it did not occur, 50 per cent. died, and it may be mentioned as a singular fact, that all save one belonged to the female sex. Five out of the six had vomiting and cramps, and two were collapsed on admission. One suffered only from cramps, and she died, her illness proving fatal in six hours: when taken out of the cholera-van she was found to be dead. Another, a boy, æt. six, who only laboured under vomiting, gradually exhibited the symptoms and signs of tubercular meningitis with effusion, of which he died 408 hours after admission; the autopsy verified the diagnosis. The details of these cases which were characterised by absence of the most constant of all the symptoms of cholera, are subjoined:—

TABLE CONTAINING THE DETAILS OF THE CASES IN WHICH THERE WAS ABSENCE OF PURGING.

Cases in which no diarrhea occurred	Vomiting.	Cramps.	Collapsed.	Length of illness in hours before admission.	Recoveries.	Deaths.	Period in hours of death after admission.	Females.	Males.	Ages.
1st	1	1	—	25	1	—	—	1	—	62
2nd	1	1	—	13	1	—	—	1	—	14
3rd	1	—	—	80	—	1	408	—	1	6
4th	—	1	1	6	—	1	0	1	—	22
5th	1	1	1	40	—	1	53	1	—	35
6th	1	1	—	24	1	—	—	1	—	40
TOTAL	5	5	2	—	3	3	—	5	1	—

Of the effect of mental emotions as predisposing causes, in the production of cholera, the following is a remarkable instance:—

Eliza Singleton, æt. 25, a fruit-seller, sold some apples from her stall to a woman who was one of her usual customers. In a few hours after a funeral passed by, which, on enquiry, she learned was that of the woman to whom she had sold the fruit in the morning, and that she had died of cholera. Such was the effect produced by this intelligence, that on the moment she took ill, and had to be removed to her home. Purging,

vomiting, and cramps set in, and were rapidly followed by collapse. When brought to the hospital she was in a state of profound collapse, out of which she happened to be amongst the few who recovered. In another instance, a boy, aged five years, was admitted, labouring under an extraordinary presentiment that he should contract and should die of cholera, in consequence of the death of a playmate in the same house from the disease.

This child died, the disease running its fatal course in 23 hours. In two cases the commencement of the disease dated from the time of administration of a dose of *ol. ricini*. Errors of diet in a vast number of instances appear to be the predisposing causes. In a few rare cases, five in number, no vomiting or purging occurred during the stage of collapse in which they were admitted; these cases all died. As a rule, the cramps attacked the muscles of the upper less frequently than those of the lower extremities. Still less frequently those of the abdomen were engaged. A great number of the cases admitted suffered from suppression of urine in a greater or less degree. Coma was very frequently the precursor of death in the cases of suppression of urine, unaccompanied by any of the other signs of uremic poisoning. One of these patients secreted no urine for three days. But the most extraordinary case of recovery with this complication was that of a man named Maguire, aged forty, who suffered from suppression 72 hours. Another case (that of John Arthur, *æt.* 30), in which, according to the patient's own account, suppression had lasted for a corresponding period, was not attended with an equally favourable issue, death following at the close of the fourth day. In the case of a man, aged 39, suppression still continuing at the end of the 3rd day, blood to the amount of four ounces was taken from the arm, and in half an hour after he secreted and passed some urine. In another instance, however, though for the same complication, venesection was ineffectually tried. After suppression had existed for 60 hours, in another case, dry cupping over the loins was tried, and 12 hours after the secretion returned. The cadaveric twitchings which occurred in several instances are worthy of special notice. The case of a boy named Villiers, aged 10, may be more particularly alluded to. In this instance about five minutes after breathing had ceased, and all other signs of animation had departed, slight tremulous spasmodic twitchings and quivering of the muscles were observed, especially of those on the inside of the thighs, legs and feet (so much so, indeed, that inversion, exversion, flexion, and extension were frequently performed, and the left foot was at one time raised about three inches from the bed on which it had been lying) of the abdominal, the pectorals, and of the muscles of the forearms and of the hands. These cadaveric movements shortly after death were also very remarkable in the case of a woman, Emma Louisa Consen: about 20 minutes after death, the muscles of all her toes, the same set of muscles which had been especially, during life, the seat of the cramps,

were seen sometimes all together, sometimes one by one, to contract and relax. The patella also was frequently drawn up by the quadriceps extensor. The muscles of the abdomen visibly quivered and contracted. The blood was found to be of a thick black, and tarry consistence.

The general line of treatment adopted was to arrest the diarrhea and vomiting as soon as was possible, by the administration of astringents and sedatives. For these purposes acetate of lead and opium were exhibited. In cases where these remedies failed to moderate the diarrhea injections of acetate of lead and opium, to the extent of fifteen grains of the former with half a drachm of the acetous tincture of opium, were employed generally with marked effects. Dr. Kennedy's patients immediately after their admission got a mustard emetic. Where vomiting was the prominent symptom, hydrocyanic acid (dilute) in variable amount to the extent of seven drops was exhibited singly, or in combination with Schacht's solution of bismuth. For the same purpose acetate of lead, spearmint water, sinapisms to the epigastrium, and mustard emetics were employed. To relieve the cramps manual friction, chloroform inhalations, turpentine stupes, sinapisms, and in some cases immediate blistering, were the means adopted. It was in those cases in which the cramps were unusually severe that chloroform inhalations appeared to be attended with the best results. In and previous to the stage of collapse stimulation was resorted to, both externally and internally. Externally by sponging with powerfully stimulating liniments of compound camphor liniment and chloroform, by the employment of manual friction, by dry heat (by means of hot jars and heated sand), and by swathing the body and limbs in flannel. Internally by the exhibition of brandy, wine, mustard emetics (Kennedy), and camphor and chloroform in solution (Banks). When suppression of urine supervened this was combated by hot stupes of turpentine to the hypogastric region, by dry and wet cupping over the loins, and in some rare cases by venesection. In some cases, though urine was secreted, it was retained in the bladder; in these cases the catheter afforded relief. The solution of the permanganate of potash was given internally by Dr. Moore in a few instances, but its use was soon discontinued. Calomel also was similarly tried by Dr. Kennedy with little efficacy.

The mortality among the patients bore a direct proportion to the length of time they lasted after admission. Thus, amongst those who came into the hospital, the greatest mortality occurred within the twelve hours succeeding the admission, 21 per cent., or one-fifth of all the patients admitted, having died within that time. More than one-third (37·57 per cent.) died within 36 hours, somewhat less than one-third (3·21 per cent.) within 24 hours, and, as before stated, one-fifth (21·02 per cent.) within 12 hours after admission; one-fifth (21·02 per cent.) died between the 1st and the 12th hours (inclusive), one-tenth (10·19 per cent.) between the 13th and the 24th (inclusive), and one-sixteenth

(6·36 per cent.) between the 25th and the 36th hours subsequent to admission. The following is a return, in a statistical form, of those cases—58 in all—which died 36 hours after admission :—

Hours after admission (inclusive)	Deaths	Per centage of deaths, in relation to the total number of deaths (72)	Per centage of deaths, in relation to the total number of cases admitted (157)
12	33	45·83	21·02
24	49	68·05	31·21
36	58	80·55	37·57
Between 1st and 12th . .	33	45·83	21·02
„ 13th and 24th . .	16	22·22	10·19
„ 25th and 36th . .	9	12·50	6·36

The particulars of these cases are subjoined :—

Time of the Deaths after Admission, in hours	Under the care of Dr. Moore	Under the care of Dr. Kennedy	Under the care of Dr. Banks	Males	Females
0	1	—	—	—	1
$\frac{1}{2}$	1	—	—	—	1
1	—	—	1	1	—
2	1	—	2	2	1
$2\frac{1}{2}$	—	1	—	1	—
$2\frac{3}{4}$	2	—	—	1	1
$4\frac{1}{4}$	1	—	—	1	—
6	—	2	3	2	3
$7\frac{1}{2}$	—	1	—	1	—
8	1	—	1	—	2
$8\frac{1}{4}$	2	—	—	—	2
$8\frac{1}{2}$	2	—	—	2	—
9	2	—	—	—	2
$9\frac{3}{4}$	—	1	—	1	—
10	1	—	1	1	1
11	1	—	1	—	2
$11\frac{1}{2}$	—	1	—	1	—
$11\frac{3}{4}$	—	—	1	1	—
12	2	—	—	—	2
$12\frac{3}{4}$	—	1	—	—	1
13	1	2	—	2	1
$13\frac{1}{2}$	—	1	—	—	1
14	1	—	—	1	—
$14\frac{1}{2}$	1	—	—	—	1
15	1	—	—	—	1
17	1	—	—	—	1
18	1	—	—	—	1
20	1	—	—	—	1
$21\frac{3}{4}$	—	1	—	1	—
22	1	1	—	2	—
24	1	1	—	—	2
$24\frac{1}{2}$	—	—	1	1	—
26	—	1	—	—	1
27	—	1	—	1	—
29	—	1	—	1	—
30	1	—	—	—	1
$31\frac{1}{2}$	1	—	—	—	1
$32\frac{1}{2}$	1	—	—	1	—
33	1	—	—	—	1
36	—	—	1	1	—
Totals, .	30	16	12	26	32

It will be seen from the foregoing table that, of those who died within 36 hours after admission, an unusually large number fell to the lot of Dr. Moore, a fact which accounts for the high coefficient of mortality (50 per cent.) of the patients who came under his charge.

It has been stated that the greatest mortality in cholera occurs at the extremes of life, among the very old and the very young. The truth of this may be tested by the following return of the cases between the ages of 1 and 79 (inclusive):—

Ages (inclusive)	Recovered	Died	Males	Females	Total number of cases	Per centage of deaths amongst those attacked
1 to 9	17	12	16	13	29	41·38
10 to 19	17	10	14	13	27	37·03
20 to 29	18	13	14	17	31	41·93
30 to 39	9	13	13	9	22	59·09
40 to 49	7	12	8	11	19	63·15
50 to 59	4	6	3	7	10	60·
60 to 69	2	4	2	4	6	66·66
70 to 79	1	—	1	—	1	—
Total,	75	70	71	74	145	48·27

The return shows that, of the patients admitted into Sir P. Dun's Hospital, the greatest mortality occurred amongst those between the ages of 60 and 69, and 40 and 49 (inclusive), the least amongst those between the ages of 10 and 19 and 1 and 9 respectively (inclusive). The epidemic spared neither age nor sex. The mortality amongst each sex was almost alike; each was alike obnoxious to the poison.

Sex	Died	Recovered	Total number admitted	Per centage of those who died	Per centage of those who recovered	Per centage of the total number of cases admitted
Females,	44	50	94	51·76	52·63	52·22
Males,	41	45	86	48·24	47·37	47·78
Total,	85	95	180	100	100	100

Of 180 cases admitted into this hospital, 94 (52·22 per cent.) belonged to the female, and 86 (47·78 per cent.) to the male sex. Of the former 44 (51·76 per cent.) died, and 50 (52·63 per cent.) recovered. Of the

latter 41 (48·24 per cent.) died, and 45 (47·37 per cent.) recovered. Thus the coefficients of mortality of the sexes only differed in the trifling sum of 3·52 per cent.

Again, if the time during which the epidemic of cholera prevailed—from August 2nd, 1866, to January 1st, 1867 (inclusive)—be divided into five periods of a month each, the coefficients of mortality for each of these periods in their order; and finally, the total coefficient of mortality of the patients admitted into this hospital, will be found in the annexed table.

THE COEFFICIENTS OF MORTALITY :—

Monthly periods	Admission	Deaths	Recoveries	Coefficients of mortality per cent.
First (August 2nd to Sept. 1st),	22	12	10	54·54
Second (Sept. 2nd to Oct. 1st),	51	25	26	49·01
Third (Oct. 2nd to Nov. 1st),	77	35	42	45·45
Fourth (Nov. 2nd to Dec. 1st),	27	13	14	48·14
Fifth (Dec. 2nd to Jan. 1st),	3	—	3	—
Total,	180	85	95	47·22

From this table it may be seen, as has been elsewhere observed, that the earliest cases of cholera were by far the most fatal. The coefficients of mortality steadily decreased during the 1st, 2nd, and 3rd monthly periods, but rose again upon the 4th to almost the same rate as during the 2nd.

The general line of treatment adopted by each of the physicians who had charge of the hospital during the prevalence of the epidemic was practically almost the same. It would, therefore, be predicated that there would be little variation in the coefficients of mortality of the patients under each, and such, indeed, was the fact. For the high rate of mortality amongst the patients of Dr. Moore may be fairly attributed to the large proportion of the rapidly fatal cases which came under his charge. And, with regard to the low coefficient of Dr. Banks, who succeeded Drs. Kennedy and Moore on November 1st, it must be borne in mind that the epidemic was then on its decline. The following table shows the number, and the coefficients of mortality and of recovery, of the patients under each of the physicians :—

The Physicians	Admissions	Deaths	Recoveries	Coefficient of Mortality per cent.
H. Kennedy, M.D. - -	79	37	42	46·83
W. Moore, M.D. - -	70	35	35	50·
J. T. Banks, M.D. - -	31	13	18	41·61
Total, -	180	85	95	47·22

It only remains to notice the dimensions of the cholera wards:—

The Cholera Wards	Height (in feet and inches)	Length (in feet and inches)	Breadth (in feet and inches)	Number of cubic inches of air in each ward	No. of beds in each ward	Number of cubic inches of air to each patient	Number of cubic feet of air to each patient
Female,	19·3	37·3	29·8	36,759,492	8	4,594,936·5	2,659·10
Male,	20·1	37·6	29·6	37,391,300	8	4,673,912·5	2,704·86

These wards, set apart at a time when the epidemic had not yet reached this city for those who might suffer from this disease, were each capable of containing 36,000,000 cubic inches of air. Each ward—that allotted to the females and that to the males—had eight occupants. Each of these, therefore, was allowed four and a half million cubic inches, or two and a half thousand cubic feet, of air. To this fact may be traced the good health of those who attended on the sufferers; and, in great measure, the recoveries of those who suffered from the epidemic.

MATER MISERICORDIÆ HOSPITAL.

Abstract of Report on Cholera. By DR. HAYDEN and DR. CRUISE.

During the prevalence of the late epidemic, 197 cases of cholera were treated in this hospital; of these a total of 106 proved fatal, and 91 recovered. Of cases in the first stage of cholera, or *choleraic diarrhea*, there were admitted 54, of these 52 recovered, and 2 died.

Of cases in the second stage of cholera, or *collapse*, there were admitted 124, of these 85 died, and 39 recovered.

These numbers do not include 19 cases which were admitted in a moribund state, and beyond hope from treatment.

The following tables exhibit the foregoing statements in detail :—

TABLE I.

Week ending	No. of cases	Average duration of illness in house		Average period in Hospital, in hours		Result		Per centage of deaths
						Died	Recovd.	
1. August 21	1	H. 600	M. 0	H. 432	M. 0	0	1	
2. August 28	4	47	0	34	45	2	2	
3. Sept. 4	13	109	13	75	41	3	10	
4. Sept. 11	13	66	9	42	41	10	8	
5. Sept. 18	13	139	34	94	28	6	7	
6. Sept. 25	30	89	14	55	14	19	11	
7. October 2	17	92	39	72	50	6	11	
8. October 9	22	82	19	54	29	14	8	
9. October 16	16	62	58	43	42	11	5	
10. October 23	21	53	42	96	8	10	11	
11. October 30	11	120	12	69	43	5	6	
12. Nov. 6	9	127	6	96	33	3	6	
13. Nov. 13	11	75	32	57	18	9	2	
14. Nov. 20	7	28	12	16	51	6	1	
15. Nov. 27	2	91	7	76	7	1	1	
16. Dec. 4	1	84	0	52	0	0	1	
17. Dec. 11	0	0	0	0	0	0	0	
18. Dec. 18	1	26	0	19	0	1	0	
Total, - -	197	105	16	77	11	106	91	53·8

TABLE II.

Number of cases in which attack was due to any assignable cause, not including infection—92.

CAUSES ASSIGNED				PER CENTAGE	
Neglected diarrhea, -	-	-	-	65	33·0
Intemperance, -	-	-	-	18	
Foul water, -	-	-	-	2	
Meal of cockles, -	-	-	-	1	
Sour porter, -	-	-	-	1	
Meal of cold cabbage, -	-	-	-	1	
Do. of fish, -	-	-	-	1	
Do. of pork, -	-	-	-	1	
Do. of badly cooked cabbage, -	-	-	-	1	
Dentition, -	-	-	-	1	

TABLE III.

Ages of patients within decennial periods, and result :—

Age under 10 years	No. of cases	Died	Recovered	Per cent. mortality
10 to 20	37	20	17	54.0
20 to 30	27	9	18	33.3
30 to 40	47	19	28	40.4
40 to 50	35	22	13	62.9
50 to 60	26	19	7	73.7
60 to 70	14	12	2	85.7
70 to 80	7	3	4	42.8
	4	2	2	50.0
	197	106	91	

TABLE IV. A.

Ages of patients, within decennial periods, admitted in stage of Choleraic Diarrhea; summary of treatment; and result :—

Age	No. of Cases	Treatment	Died	Recovered	Per Centage
Under 10 years	6	* Dilute sulphuric acid and opium, creasote-water <i>ad libitum</i> , - - - - -	-	6	
10 to 20	7	6 dilute sulph. acid and opium; 1 chalk mixture, -	-	7	
20 to 30	19	12 do. do. do. in 1 this was preceded by a draught of castor oil, and in another it was followed by calomel given as stated below; 1 case got tinct. opium m x in an ounce of brandy, calomel was then given followed by bismuth and chlorodyne draughts; in one case a draught of oil with tinct. opii., and creasote-water for drink; in 4 cases purgatives were given, and 1 was treated expectantly, - - -	-	19	
30 to 40	10	In 1 case acid and opium mixture with creasote, and external heat constituted the treatment; 4 acid and opium; 1 calomel and creasote; 2 chalk mixture; 1 expectant, - - - - -	-	10	
40 to 50	4	In 1 tinct. opii. with nit. spirit ether and camph. mixture was given, preceded by draught of c. oil; in 1 oil draught followed by calomel in usual doses; 1 chalk mixture; 1 acid astringent do. - - - - -	1	3	3.7
50 to 60	2	Acid astringent mixture, - - - - -	-	2	
60 to 70	4	1 acid astringent mixture; 1 calomel followed by bismuth, chlor. ether, and tinct. opii. in camphor mixture; 2 chalk mixture, - - - - -	1	3	
70 to 80	2	1 chalk mixture, 1 spir. am. aromat. with laudanum, - - - - -	-	2	
Total, -	54				

* The mode of administration of sulphuric acid was usually as follows:—10 to 15 drops or more of the dilute, or of the sulphuric acid and with 5 drops of laudanum, and frequently 5 drops of tincture of capsicum, myrrh, or camphor, in an ounce of water, given after each evacuation.

TABLE V. B.

Ages of patients within decennial periods admitted in stage of collapse (*Algid Cholera*)—summary of treatment and result:—

Age	No. of cases	TREATMENT	Died	Recovered	Per centage
Under 10 years	26	21 calomel, in 3 of which concentrated solution of camphor was likewise given, and in two of them inhalations of the nitrite of amyl; in 1 the warm bath; 4 diffusible stimulants, and in 1 of them also amyl inhalations; 1 arsenic; sinapisms and creasote-water, ...	15	11	12.1
From 10 to 20	19	13 calomel, and in 2 of these bismuth, &c., draughts; 2 quinine (1 with chloric ether); 2 stimulants; 4 diffusible stimulants, with effervescents; 1 digitalis, with spirit of juniper and nit. sp. of ether, ...	7	12	5.64
" 20 to 30	25	21 calomel (in 4 preceded by dose of castor oil), and in 9 of these bismuth and chlorodyne, draught, &c.; oxygen inhalations in 2 cases, and n. amyl in 1; venesection in 1; 2 got diffu. stim. and effervescents; 1 Belladonna and permanganate of potass; and 1 arsenic, ...	17	8	13.7
" 30 to 40	19	15 Calomel, with sinapisms, heat, and friction; of these 3 got brandy, 1 spt. camphor, and 1 amyl inhalations; 1 permang. potass; 1 hyposulphite of soda, with digitalis and dry cupping; 2 stimulants, ...	16	3	10.9
" 40 to 50	20	12 calomel, and 5 of these bismuth, creosote, and morphia also, after each dose of calomel; camphor in 2; amyl inhal. in 1, and oxygen do. in 1; castor oil before the calomel in 2; in 2 digitalis, with n. s. ether; and in 2 stimulants, ...	11	4	12.9
" 50 to 60	10	9 calomel; in 1 of these bismuth draughts; 1 hyposul. soda; and in 1 oxygen inhalations, ...	10	0	8.0
" 60 to 70	3	2 diffusible stimulants; 1 calomel, ...	2	1	1.61
" 70 to 80	2	2 calomel; in 1 of these diffusible stimulants also, ...	2	0	1.61
Total,	124		85	39	68.5

Calomel was given as follows, viz.:—Gr. x. were given at once, and subsequently gr. ii. every hour. In the case of children, the doses were reduced in proportion to the age. In the event of the stomach rejecting the calomel, a draught, consisting of liquor bismuth with chlorodyne, was given after each dose. In cases in which the stomach still continued to reject the mercurial in this form it was administered by injunction or suppository. The drink given was creasote-water (m. iii. to a pint of water) *ad libitum*. The nitrite of amyl was administered by inhalation in several cases, with the result of a slight but temporary elevation of temperature; oxygen was likewise similarly given in some cases, but with no marked beneficial result.

POST MORTEM APPEARANCES IN COLLAPSE.

General condition of body.—The *post mortem* rigidity of very short duration; lividity less marked than before death; in some cases temperature raised.

Cerebro-spinal system.—Cerebral veins and sinuses engorged with dark liquid blood; in cerebral ventricles and subarachnoid spaces a small quantity of clear serum; puncta cruenta large and numerous; spinal cord and membranes normal.

Ganglionic system.—Solar plexus and semilunar ganglia normal.

Thorax.—Lungs congested but still crepitant; right cavities of heart filled with dark uncoagulated blood; left auricle and ventricle contracted and empty—the latter much reduced in size, and its walls thickened.

Abdomen.—Liver, spleen, and kidneys normal; peritoneal investment of viscera white and polished; mesenteric glands considerably enlarged. Stomach containing a small quantity of gruel-like fluid; mucous lining of vesophagus prolapsed into stomach, and presenting the appearance of wet parchment; mucous lining of stomach mamillated; intestinal canal nearly filled with a fluid like thin boiled starch mixed with white floculi. Brunner's glands enlarged; both solitary and agminate glands enlarged and filled to distention with opaque fluid; mucous lining vascular in jejunum and upper part of ileum; towards termination of ileum Peyer's patches were in a state of erosion, the contents of the glandules having escaped through small apertures, visible on the surface. The fluid contents of the glandules, examined under the microscope, were found to consist of large granule cells and amorphous granular matter.

Larynx.—Vocal cords thickened and ventricles reduced in size, but without vascularity.

Diffusion of Cholera.—In no instance did the disease spread in the hospital, although, during the whole continuance of the epidemic, many were fully exposed. Of these we may specially mention the Sisters in charge of the wards—the medical officers, the clinical clerks—the class—the ward maids and porters engaged in carrying up the sick and removing the dead. One woman, in one of the general wards, took cholera and died; upon full investigation the origin of her case was clearly traced to an infected lodging-house in which she had stopped previous to entering the hospital.

Disinfection, Ventilation, &c.—The *excreta* of the patients were promptly disinfected by means of chloride of lime and carbolic acid. Thorough ventilation was scrupulously attended to. The patients generally had a breathing space of more than 2,000 cubic feet.

SECOND NIGHT, APRIL 4TH, 1867.

DR. STOKES, President of the College, in the Chair.

The President said that since the last night of meeting a very important report had reached Dublin of a singular outbreak of cholera in the city of Utrecht, in Holland, which had been submitted to him by his friend Dr. W. D. Moore, with a short abstract; and it was the opinion of the Council that, looking at the great importance of this report, which gave an account of an outbreak of cholera in many respects analogous to that at Mountjoy Prison, recorded by Dr. M'Donnell, it would be desirable, if Dr. Moore would be kind enough to initiate their proceedings by the reading of that paper. Dr. Darby had also a report of the outbreak at Bray, but he would incorporate the matter of it in his speech that night.

Dr. Moore then read the following:—

Mr. President—Two or three days ago I received from Professor Donders, of Utrecht, the loose sheets of a recent number of the *Dutch Archives of Medicine*, in looking through which I met with an interesting account, by Dr. Snellen, of a very remarkable outbreak of cholera which occurred last year in a limited district of Utrecht, during the prevalence of that disease in an epidemic form in the city at large. It appears to me that this epidemic within an epidemic, if I may so speak, presents some points of resemblance to the very remarkable outbreak which occurred last December in the Mountjoy Prison, and which has been so ably described by Dr. M'Donnell, and that it might be profitably taken into consideration in connexion with the report from the prison already in the hands of the members of this society. I have, therefore, made a very short abstract of Dr. Snellen's communication, which, as you, sir, and the Council have kindly permitted me to bring it forward on the present occasion, I shall now read for this meeting.

Local Extension of the Cholera Epidemic: Utrecht, 1866. By DR. H. SNELLEN. Abstract of the above paper from the *Nederlandsch Archief voor Genees en Natuurkunde*, 1866, Deel 2. Aflevering 4. By W. D. MOORE, M.D., Dub. et Cantab., M.R.I.A.

The first case of cholera occurred in Utrecht (the population of which is about 60,000) on the 6th April, 1866; the second on the 21st of the same month. The subsequent numbers were, up to the

11th June,	-	-	-	-	224 cases.
11th July,	-	-	-	-	1,734 „
11th August,	-	-	-	-	2,221 „
The middle of September,	-	-	-	-	2,400 „

In the Gasthuis-steeg (Hospital Lane), the seat of the special outbreak now under consideration, the first case occurred on the 11th June, the last on the 6th of July. Seventeen per cent. of the population were attacked, and ten per cent carried off by the disease. The course of the local epidemic extended over twenty-five days, before or after which time not a single case occurred, although in other parts of the city cholera was met with from April, and continued to rage in the middle of September, the date of Dr. Snellen's paper.

The Hospital Lane is a passage connecting Bilt-street and the White Lady Counterscarp, and running from the north-east to the south-west. Its length is about 150 yards, its average breadth is only four yards, while, according to the building regulation, it should be at least eight yards. It is not a public way, the thoroughfare being in general closed against carriages. It contains, including the three courts connected with

it, seventy-five houses, all of one storey; eighty-three families, and 380 inhabitants.

The author enters into details respecting the several houses invaded by the disease, and their relation to pumps and privies, to follow him through which would occupy too much time. On the plan annexed to his paper the number of inhabitants in each house is represented by a corresponding number of circles, plain in the case of those who escaped the disease, black in the case of those attacked by it, and black with crosses annexed to represent patients carried off by cholera. The *plain* circles with crosses annexed, of which there are, I believe, only two in the plan, represent individuals who died during the twenty-five days of other diseases than cholera; the plain circles outside the houses represent more recently arrived inhabitants; the pumps are marked by a double circle and an appendix; the privies are evident; the grates of sewers are marked by shaded parallelograms; the date connected with each patient indicates the period of his or her attack.

It may be well to quote a couple of examples to show the apparently capricious nature of this invasion of cholera. The author says:—

“It was a meritorious work of the *Society for the Improvement of Dwellings* to purchase and considerably to improve the first block of houses, which was in by far the most wretched state. These four houses (148*a*, 149*a*, 150*a*, 151) were then raised some feet, as was the yard behind them, and good drainage was secured. We find here one good pump and two privies. The adjoining block—152-155—continues as low as before; the yard behind it is in general a pool; there is one privy, which does not deserve the name.

“It is remarkable that in the first block—in the now good houses—among the twenty-two inhabitants, four cases (eighteen per cent.) of cholera occurred, while on the other hand, in the block of unimproved houses, among the seventeen inhabitants, not a single case was met with.

“It now remains to examine the largest block of houses (166*n* to 166*pp*)—a block which has acquired a sad celebrity, inasmuch as thirty-two cases of cholera have occurred among 106 inhabitants—that is, thirty per cent. Of these thirty-two cases, twenty-three proved fatal; *twelve times more* cholera having occurred in this locality than had, on an average, at the time (in the beginning of July) visited the whole city. (In the beginning of July cholera had attacked 2·5 per cent., at the close of the epidemic four per cent. of the population.)

“It seems important to examine this block of houses accurately. We here find twenty-one houses, all of one story; twenty of them harbour each only one family. The houses appear to be well built, and are comparatively well kept. Each dwelling consists of two apartments and a garret. Front and rear we find in each house a door and a window; there is consequently abundance of light and air. Behind these twenty-one dwellings

is a common yard, in which, along the houses, is a lane or trottoir, to which I shall revert; along it is a row of linden-trees; the further part of the place serves as a bleach-green. The inhabitants belong (or rather a considerable number of them belonged) by no means to the pauper class.

"The great mortality here attracts our attention still more, when we come out of the immediately adjoining Stevens' foundation. The Stevens' foundation is separated from the Hospital Lane only by a wall. In it 260 persons dwell in fifty houses; here only one fatal case occurred, and, that in the person of a woman, who had been, just before, day and night in the family of her son, where three persons were lying at the same time in cholera. In other parts, too, of the neighbourhood of the Hospital Lane, comparatively little cholera was seen at that time."

Behind these dwellings we find seven privies; they are in comparatively good order; they discharge into a channel which runs along the wall behind the bleach-green, to the moat. Into this same channel the privies of the Stevens' foundation empty themselves. We find here two pumps, yielding clear and well-tasted water; to these pumps we shall revert.

Of the 380 inhabitants of the Hospital Lane 170 were of the male and 210 of the female sex; 28 men and 35 women were attacked by cholera; that is of the men 16 per cent. and of the women 16·5 per cent. This is indeed a remarkable equality for the two sexes. The inhabitants are all industrious people, earning 10s. to 16s. a week.

"In former epidemics there were attacked in this district, in 1832, 2 cases, in two dwellings; in 1849, 22 cases, in 9 dwellings; in 1859, 2 cases, probably in 1 dwelling; in 1848, no case occurred, nor in 1853, 1854, and 1855. In 1866 the total number of cases was 63, or 16·6 per cent. of the population, while the deaths were 39, or 10 per cent."

The question, observes the author, rises to every one's lips—"Whence in this case the local violence of the epidemic, so extremely limited in time and space, running its course in twenty-five days, confining itself in its immediate vicinity to one street?"

To answer this query would be, he further remarks, to answer the general question—"What is cholera and whence comes it?" It is certain that in the Hospital Lane no special causes were discoverable, and the phenomena observed in connexion with the first appearance of the disease are precisely the same as have been witnessed in a great number of other points of the city.

On this subject the author endeavoured to throw light by experiments upon animals. In contrast to former statements, he did not succeed in conveying the disease to them. He tried dogs, an ape, a pig, rabbits, hens, frogs, and fishes.

The principal questions connected with the spread of cholera are:—

Is the infecting matter transmitted through the air?

Is the earth the conductor of the contagion ?

Can direct transference from sick to the sound exist ?

"The cholera proceeds from one sick individual and infects others." As to the truth of this proposition all are agreed. It has been satisfactorily demonstrated that the disease arises epidemically in no place where it cannot be conveyed by the sick, or by what was in contact with the sick. But how further? "Through the air?" Many think so. On this point the author proceeds to quote the International Sanitary Conference at Constantinople, and also the views of Pettenkofer. In his own opinion *it is exclusively the digestive organs by which the infecting matter enters the body.* In support of this view he examines in detail the pumps and privies in Hospital Lane, and concludes his paper in the following words:—

"We have in vain sought for any fact plainly at variance with the proposition that the cholera miasm must be received exclusively in the digestive organs. We are convinced that the hypothesis of the transmission of the contagion, not through the air, and not through mere contact, removes the difficulties always correctly adduced against the former idea of the contagiousness of cholera.

"It is true that the final cessation of the epidemic is difficult to explain: why does it not always continue? This difficulty, however, cholera presents in common with all epidemic diseases, as well as with the diseases of plants and animals.

"Every investigation as to the influence of atmospherical causes upon the advent and departure of the epidemic has hitherto afforded only negative results. Only it would appear that much rain favours the decrease of the disease. It is certain that the rain washes away and washes out much. In the night between the 29th and 30th June, in the course of about eight hours, sixty-five million gallons fell on the surface of Utrecht; as much as if each of the inhabitants had on that night employed fifteen or sixteen gallons in washing the ground.

"It is more than probable that in cholera, as in all other diseases, the individual influence of receptivity exists: the same injurious agency, which produces cholera in one, will probably in another develop only choleraic diarrhea.

"We may reasonably hope, that individual receptivity will diminish, if we proceed energetically in the beaten way: '*providing for good drinking water, for the improvement of the food of the people, for the promotion of cleanliness, and for the removal of injurious filth, for the improvement of dwellings,*' and not less '*for the investigation of endemic diseases.*'"

Dr. Darby said he had not originally the slightest intention of making any report of what had occurred in the hospital under his care until he heard the reports which were read on the last evening, and those reports being so very different in their results, he thought it right to take an opportunity of mentioning the facts which had come under his own

observation, and which he had publicly recorded. He had, between the 28th of September and the 28th of December last, sixty-one cases of what he had entered in his registry as cases of cholera, and out of which he had only seventeen deaths. Now, when he heard the reports read the other night, he thought he must have made a great error in entering those cases, or many of them, as true cases of cholera; but he came, on considering the matter, to the conclusion that the gentlemen who had made some of the reports from the large Dublin hospitals were at issue with him as to what cholera was. One gentleman said he did not regard as cholera any case that had only purging, vomiting, and cramps. Now, he had recorded cases as cholera that had only purging, vomiting, and cramps, with peculiar expression of countenance. If such cases were not to be regarded as instances of true cholera, then he was altogether at issue with some of his medical brethren, and he thought the statistics of the disease obtained from the country dispensaries generally would be very fallacious. He did not think that a case of purging, vomiting, and cramps, during an epidemic of cholera, could be considered as any other disease but cholera. He was actively engaged in 1832 as a pupil attending cholera cases that occurred in Dublin, and ever since that he had been engaged in the treatment of cholera cases on every occasion when the disease appeared in this country; and he would say this, that he had never seen what was called English cholera—that disease met with in the latter end of Summer or Autumn, and which they were in the habit of attributing to the eating of fruits or fresh vegetables—he had never seen that disease as an epidemic in his life. He thought when an epidemic of cholera was present, and a patient was attacked with purging and vomiting, they had no option, but must call the case one of cholera. Take any other disease that was an epidemic—scarlatina or typhus, for example—and if they excluded all malignant cases, and took nothing but the mildest types of it, they would see what an alteration would be made in the average of mortality. He saw no difference between English cholera and Asiatic cholera, but that one appeared sporadically, and the other as an epidemic. He did not know what people meant when they spoke of choleraic diarrhea. He had seen diarrhea when cholera was present, but that it was different from diarrhea, properly so called, when cholera was not present, he could not perceive. Again, if it were said that cholera depended on a certain poison, and if it were said that when a person was attacked by diarrhea, that would, if unchecked, run into cholera, which was the generally received notion, what followed? Was it not clear, if diarrhea runs into cholera, and if cholera depends on a poison, that the man who had the diarrhea must have been poisoned in the first instance? Was it not a poison, if there be a poison, that gave the diarrhea? He had dwelt upon this point to justify his own report. He should not wish that any one would suppose for a moment that he

would exaggerate the results of his treatment, or call a case one of cholera which he did not believe to be cholera; and if he did not give an explanation of this kind, it might appear either that he was presumptuous enough to suppose that he could cure patients in a greater proportion than the greatest physicians in the land, or that he was altogether ignorant of what cholera was. He had divided the total of sixty-one cases received into the Rathdown Hospital, from the 28th September to the 28th of December inclusive, into three classes—viz., males under ten, females above ten, and children of and under ten years of age. In the month of September there were two males and two children, and one male died. In October five males, thirteen females, and nine children—a total of twenty-seven. There were two deaths of males, two of females, and three children, making a total of seven deaths. In November six males, nine females, seven children—total, twenty-two; the deaths were one male, two females, and two children—total, five. In December two males, three females, and three children—total, eight; the deaths were two males, one female, and one child—total, four. He had further divided the patients into mild and severe cases, meaning those that did not go into collapse and those who did. Thus seven males, nine females, and several children, making a total of twenty-three cases, were admitted to hospital in a state of collapse. Of the thirty-eight who were at the time of their admission not in that stage, seven went into collapse and thirty-one pursued a mild course. The youngest child who died was only four months, the oldest man was seventy years.

Dr. MacSwiney said—The five Dublin reports, of which the “abstracts” were now before the association, and which they might expect to see in a short time published in a full and complete form—must be regarded as important documents, embodying the experience of skilful physicians, and containing a very large and varied amount of information respecting the recent outbreak of epidemic cholera. And, if the value of the facts contained in these reports were not as great as it might reasonably be expected to be—and he thought that this was the case—he ventured to say that the explanation would be found in the circumstance that one condition, essential to the full success of such reports, was not adopted at the outset. He alluded to a fixed uniform basis of tabulation, under the several “heads” of which could have been clearly catalogued the different items in each report. Had this been done, they would now have had before them a means of observing at a glance, the several facts stated and conclusions arrived at, each under its proper designation; and he believed that, in that way, great additional weight would attach to the reports. As it was, he feared it would be difficult to extract, and present, in a condensed form, the full value of all the information contained in these documents. The principal points respecting *Asiatic cholera* required to be elucidated may be stated to be—

Its nature (including the question of contagion).

Its best treatment.

Its best preventatives.

Its present death-rate.

He had analysed the "Abstracts" with a view to discover what help towards advancing our knowledge upon these points might be derived from the study of them. The following short table would show, in his opinion, that an error, fatal to the full usefulness of these reports, was made in not originally basing them upon a common foundation, where a uniform shape and nomenclature would be used:—

Hospitals	Admitted	The Cholera	Pronom- i-tary	Diarrhea	Purg- ing	Vomit- ing	Vomit- ing and Cramps	Collapse	Conse- cutive Fever	Death rate per cent
Mater Misericor.	197	—	—	54	—	—	—	124	—	53·8
Meath, -	130	—	8	—	—	—	—	117	5	51·5
Dun's, -	180	—	—	—	142	130	84	74	—	47·2
Hardwicke, -	277	193	—	68	—	—	16	—	—	66·3
Mountjoy, -	9	—	—	4	—	2	—	1	—	44·4
Total, -	792	193	8	126	132	142	100	316	5	

This table might be greatly extended in the same direction. It was not necessary to indicate, in detail, what it shows; he would merely remark that the terms placed over the several columns *were those employed in the Reports*, an inspection of which would at once point out the nature and grounds of his objection. An adherence to a common plan would also, probably, either prevent the following discrepancy between the statements in two of the reports, or else explain the cause of such a singular difference in the experience of the two hospitals.

"The earliest cases of cholera were by far *the most fatal*."—*Duns*.

"The earlier cases were more amenable to treatment; while, as the epidemic advanced, the disease assumed a more malignant type."—*Meath*.

As to the treatment, he did not think any certain or exact conclusion could be arrived at from a study of the allusions to the very numerous remedies contained in the "Abstracts." Perhaps the reports, when published in full, might contain some more precise information on this point than was indicated in the "Abstracts." He assured them that he made those remarks in the interest of science alone, and that he was fully sensible of the great amount of important facts and observations detailed in these valuable reports.

Dr. Lyons said they all knew that in cholera epidemics there was a vast difference in the mortality in different portions of the country. He could not agree with the last speaker that it would have been of advantage to tabulate the cases from a common point of view. He thought by the method adopted they had derived much more satisfactory information

than if they had obtained it in accordance with one uniform plan. Presently he would have to suggest a mode by which the data collected might be reduced to a uniform standard. He thought it might be useful to state what the exact data of mortality was as recorded in other epidemics. During the epidemic of 1848-9 in England, the cholera destroyed 85 in 10,000 inhabitants in low sea-side districts; in inland towns it was fatal to 38 in 10,000 inhabitants; in London to 62 in 10,000, and in country localities near small streams to 12 in 10,000 inhabitants. The general average of deaths for England was 30 in 10,000 inhabitants, the total deaths for all England in 1849 being 53,292. Now calculating on such data, the late Dublin epidemic was fatal in the proportion of 40 in 10,000 inhabitants. Some other data of interest might be derived from the facts before them as compared with the facts of other epidemics. In England in 1849 the co-efficient of invasion of the disease or its power of extension will be found to have been for all attacked 0.95 per cent. of the whole population. In the remarkable epidemic at Utrecht brought before them that evening, the per centage was 9, a most extraordinary amount. In Dublin, in 1866, the co-efficient of invasion was about 0.90; in the Hardwicke Hospital in that year it was 1.43, but if the whole population of the three hospitals of the House of Industry were taken, the co-efficient of invasion amounted to 0.45 per cent., showing a very important bearing on the question of contagion or non-contagion; because it showed that in a population peculiarly exposed to influences that might be supposed favourable to the propagation of cholera by invasion, the tendency to spread to individuals was 0.45 per cent., which was less than half the co-efficient of invasion in England in 1849, and considerably less than that which the disease exhibited for the total population of Dublin, which reached 0.90. There was admitted to the Richmond Hospital a patient with fracture of the humerus, who developed cholera, was removed to the Hardwicke Hospital, and died, but the disease did not spread within the walls of the Richmond; there was constant intercommunication between the attendants of all three hospitals. It would be seen that while generally the mortality and co-efficient of invasion were high in the city during the epidemic, the co-efficient of invasion was certainly low in the hospitals taken altogether. It might be asked, were we at the beginning or at the end of a great cholera wave? In his opinion, we were at the beginning, or rather in the interspace between two great waves. What was the practical lesson they should derive from this? He should say, in broad terms, sanitary agitation or agitation for sanitary reform in the city. Much had been done in this way, but a vast deal more remained to be done. What lesson was to be derived from the result of the admission of cholera cases into the general hospitals? He believed the results showed that it was useful, and at the same time safe for persons suffering from cholera to be received into the general hospitals, and that it was

greatly to be desired that facilities for their reception into all general hospitals should be increased, and furthermore, that local hospitals for the treatment of the disease should be established, as far as possible, with a view of having patients received at once and treated immediately. Dublin was a natural home for cholera, and much remained to be done to render the city less liable to the invasion of the disease. Our river required to be cleansed, our sewers to be attended to, our streets to be purified, and better provision made for the disposal of our household and domestic sewage. He thought there was a great deal of valuable instruction to be derived from the hospital reports which had been read. They showed in a logical manner against the conclusion that the disease was capable of being spread by contagion, and furthermore, that contagion must be necessarily excluded if we take into account the argument which the time at his disposal would not enable him to develop, to be drawn from the co-efficient of invasion of the disease, as exemplified amongst our own population, or the special and limited population of the hospitals, and as compared with the spread of the disease in other circumstances and in other towns. With regard to the question of contagion, they must argue logically from contagion to quarantine. Now it had been fully established that quarantine was totally incapable of excluding the disease; it would over-leap all the bounds which quarantine in its most stringent form had been able to establish in the shape of a cordon. Quarantine meant exclusion, stoppage of commerce, passenger and other traffic, and would be quite impracticable in these countries. Fancy a gentleman coming over here in the Holyhead steamer, and finding the police standing on the quays to prevent his free debarkation, which they knew to be so common a means of attempting to check the introduction or propagation of the disease in cities or districts where ultimately epidemic disease of every kind had been known to spread.

Dr. Hayden begged to remind his friend Dr. Lyons of two notable instances of protection afforded by quarantine against the invasion of cholera. During the late epidemic of cholera in the Mauritius, as reported in an admirable memoir, recently laid before the Cork Medical Society, by Dr. Hardie, Surgeon 73rd Regiment, whilst that island was being decimated by the disease, not a single case occurred in the adjacent island of Réunion, which was in the possession of the French, and *protected by quarantine*. Again, whilst the cholera epidemic of 1866 travelled along the European coast of the Mediterranean, it respected Sicily and Greece, both of which were *protected by quarantine*. As regarded the general question under debate, it seemed to him that one of the most remarkable properties exhibited by cholera, in common with all other epidemic diseases, was that of occasionally transgressing the limits that ordinarily confine its operations, and devastating regions far beyond the limits of its endemic habitat. To what is this due? Is it the result of

a concentration of the specific poison in the atmosphere, to saturation-point, and its consequent diffusion by the convenient channels of outlet afforded by commerce and human intercourse? or is it that the atmosphere of certain portions of the earth's surface, commonly unfavourable to cholera, undergoes, at certain times, and under the influence of some unknown cause, changes favourable to its reception and development, and requiring only the introduction of the specific morbid poison to develop the disease in all its potency? Whatever the opinion upon this subject may be, it is all but certain that cholera is conveyed between distant places *only* by man, and his articles of dress, furniture, traffic, &c.; sir (continued Dr. Hayden), I deem it no less certain that it is contagious, or communicable from the infected directly to the uninfected. The *media*, through which contamination is effected in the majority of instances, I believe to be the air breathed and the water drunk, and containing in either case, in suspension or solution, the specific poison of cholera, which thus finds entrance into the circulation by the lungs or alimentary canal. In regard to water, I believe the communication of cholera through this medium is not so well established as it is in regard to atmospheric air. Indeed, I rather incline to the opinion that in most instances of alleged communication of the disease by the water drunk, the latter, being simply of an unwholesome character, has acted rather as a predisposing than as an exciting cause of the attack. As the question of contagion is that upon which the most marked difference of opinion exists in relation to cholera, I will, sir, with your permission, devote the few moments that remain to me to the discussion of this portion of the subject, reserving for another place the consideration of it in its several departments. It is noteworthy, as bearing upon the subject of contagion, that cholera has never yet been proved to travel faster than man; whereas, in innumerable instances, it has been demonstratively shown to vary with the rate of man's progress. As facts are more convincing than mere assertion, I will take the liberty of submitting to the society the two following examples of communication of cholera by contagion. One of these came under my own cognizance, and for the particulars of the other I am indebted to a medical friend in this city, who vouches for their accuracy:—

Mrs. G., a woman of middle age, and in the enjoyment of comparatively good health, came up to Dublin from a remote part of the county Meath, on the 5th of November last, for the purpose of having her infant, ten months old, operated on for club-foot. She was admitted into the Mater Misericordiæ Hospital on the following day (6th), and placed, with her child, in the female surgical ward. On the morning of the 13th November she was seized with cholera, and at once transferred to the female cholera ward up-stairs, having continued to suckle her infant up to the moment of her removal. She died of cholera on the evening of

that day, the infant continuing unaffected then and subsequently. No little uneasiness was felt lest this woman had contracted cholera whilst in the hospital, and the disease was about to spread amongst the patients generally. The most searching inquiry was accordingly instituted, with the view of ascertaining whether she had been at any time in the neighbourhood of the cholera-wards, in contact with the cholera patients, or in any way, directly or indirectly, exposed to contagion whilst in the hospital. The result was the conviction that no such exposure had taken place; the woman had not once gone beyond the corridor adjoining the female surgical ward, which is on the second floor, the wards appropriated to cases of cholera being on the third floor, and quite remote from the former. Both wards had separate attendants and implements, and the most scrupulous care was taken to guard against the communication of cholera by those on duty in the infected wards. It is to be remarked also, that the woman G. was the only inmate of the ward which she occupied who was not suffering from disease or accident of some kind, and that the surgeon in charge of her child had no contact with, or relation to, the cholera cases. On the 16th November the husband of this poor woman came to Dublin, and in a conversation with one of the sisters of the hospital stated, that on the night of his wife's arrival in Dublin, she slept in a lodging-house where cholera had recently been, and expressed the opinion that she there took the disease. On inquiry, it was ascertained that the house in which the woman had slept was 20, Greek-street, and that in that house there had been a case of choleraic diarrhea late in September, and in the adjoining house, No. 21, no less than five cases of cholera in September and October, whilst that street (Greek-street) yielded, probably, a greater number of cases of cholera than any other street on the north side of the city. It would, therefore, appear that this woman received the cholera-poison in that lodging-house on the night of the 5th November, and developed it in the hospital during the week between the 5th and 13th November. It is impossible to arrive at any other conclusion than this, and I would respectfully ask the gentlemen who advocate the view that cholera is not contagious, to say, whether, if evidence equally strong had been furnished in regard to the communication of typhus fever, scarlatina, or any other admittedly contagious disease, they would hesitate to declare that the disease in question had been then and there contracted by contagion? A medical friend, in large practice in Dublin, has furnished me with the following particulars:—An old lady and gentleman, friends of his, came up to Dublin in August, 1849, from a remote part of the country, where cholera had not appeared, in order to spend some weeks at the sea-side; they took apartments at Blackrock, and on the morning after their arrival my informant was hastily summoned to attend the lady, who was reported seriously ill; he hired a car at the railway-station to drive him to his

friends' lodgings, on approaching which the driver significantly remarked that a person who had died of cholera had been removed for interment from that house on the morning of the previous day. The lady, who occupied the same apartments as the person who had died of cholera the day before, there being no others to let in the house, had a severe attack of cholera, from which she was convalescent, when her husband communicated to her the startling intelligence that he too was attacked by cholera, in consequence of which she had an apoplectic seizure which carried her off. The husband ultimately recovered, after passing through the stages of genuine cholera, but a servant of the house, who was subsequently attacked, died of that disease. I might multiply examples of this kind, did the time allowed for addressing the Society admit of my doing so.

Dr. Moore, F.K. & Q.C.P., said that during last Autumn he was engaged with Dr. Kennedy in treating cases of cholera in Sir Patrick Dun's Hospital, and his idea was to check the diarrhea as the best way of dealing with the disease in the first instance. If all cases of vomiting and purging, without cramps, were excluded, the per centage of mortality would have been much greater. He found the mortality in the Hardwicke Hospital was sixty-six per cent., in Dun's Hospital forty-seven per cent., and in the cases which occurred under Dr. McDonnell, the mortality was under fifty per cent. He asked how was this to be accounted for? and he found on inquiry, that it occurred exactly in the way he had expected. The provision made for the epidemic of cholera, under the Poor Law administration, completely fell through. On the south side of the city twenty-eight beds were open for cholera patients. A rush of cholera came on. Eight beds additional were opened in Dun's Hospital; but there was a limit to this, and the result was that the accommodation provided was insufficient. Cases were brought to the Meath Hospital, but could not be received; they were then taken to Dun's Hospital, but when that, too, was full, they were sent on to the Hardwicke Hospital, where they arrived in a moribund condition. If ever we were afflicted with another visitation of cholera, he believed that if a house-to-house visitation were adopted, all the general hospitals opened, and temporary hospitals established in different parts of the city, the most satisfactory results would follow. He thought what he had stated was a strong argument for the adoption by the authorities of more active and decided efforts, in a sanitary point of view to check the epidemic.

Dr. Henry Kennedy began by saying he was a non-contagionist; and he said so, though aware of the many arguments, some of them very forcible, which had been advanced on the other side of the question, and, more particularly, he must advert to the very elaborate paper, or rather essay, by the late Dr. Graves, which had appeared first in the Dublin Journal, and, subsequently, in another form, had been transferred to the volume of *Physiological Essays*, written by Dr. Graves, and edited

by Dr. Stokes. Dr. Kennedy thought that, in the consideration of this question, several points had been overlooked. He then went on to say :—“ Several years back, whilst investigating the subject of epidemics, I was struck by the fact that all those which had traversed a large portion of the globe travelled in the one direction, that is from the east to the west, or from south-west to north-west. This appeared to me of such importance that I had a chart printed of these epidemics from the earliest records, and brought it before the Royal Irish Academy. It shows that, ages ago, when human intercourse must have been vastly less than at the present day, epidemics travelled as they have done of late, and of which the cholera in each of its invasions afforded a very good example. It is also proved that the epidemics affecting cattle travelled in the same way, and the cattle-plague of last year was an example of this kind, having come to Great Britain from Russia. As an evidence of what may be deduced from the chart, I may mention that in the great epidemic fever of 1847-48, it was the fashion to speak of Ireland as being the originator of the disease. Now this was a mistake. Fever had existed in England far above the averages, and for months before it reached this country. Nor was this the first occasion on which a similar event had occurred. But further, and still speaking of the question of contagion, I would observe many seem to think that because an epidemic occurs, it must therefore be contagious. Two, three, or more cases have arisen in one house, within a brief period of each other, or it may be one room, and the conclusion is hastily jumped at that the spread of the disease, whatever it be, must be due to contagion. Now, on this point, I would ask—Is not the occurrence of cases in such rapid succession opposed to any real knowledge we possess of the laws of contagion? Have we any reason to suppose that a few hours are sufficient, not only to generate, but to bring into active life, such a disease as cholera? Are not the cases too frequently simultaneous? and will they not thus prove more than even contagionists demand? In support of these views I would further mention a fact with which all who have had charge of a large hospital must be quite familiar. I mean the sudden appearance of a disease in a single night. Thus, three or four cases of erysipelas will occur within a certain twelve hours, or an invasion of laryngitis, or otitis, or pneumonia, or a number of the patients will be found worse on the same morning, when there was every reason to have expected the contrary from their state the previous day. All these considerations and facts—and they could have been easily added to—have ever led me, when speaking of the contagion of cholera, to look upon what I would call negative evidence as by far the most important which could be adduced on the question. Now, of this kind of evidence there are, I believe, more numerous facts than have ever been brought forward about any other disease, in which the question of contagion

arose. By far the greater number of those who have seen the disease in India are non-contagionists, and the scale on which they have seen the disease entitles their opinions to the greatest weight. Again, the late Dr. G. Kennedy told me he had been sent down to Galway in 1832, and that if ever an opportunity offered when contagion might have been expected to have played a prominent part, it was then; that the town was severely visited; and the people taken quite unprepared; that the houses, nurses, and every requisite had to be got at a moment's notice; and yet with all this the nurses escaped. Dr. Byrne, of the Lock Hospital, who was also sent down then, can confirm this statement. The result, too, of the last epidemic in Dublin also bears out these facts, for the attendants at the several hospitals may be said literally to have all escaped. Neither can I omit noticing the fact that cholera, of all diseases, brings the nurse and the patient into the closest contact. If cholera be contagious, it is little short of marvellous to explain how so many escaped. When epidemic fever visited us in 1847-48, every new nurse at the Cork-street Hospital, where some six hundred beds were open, took fever within a month of their appointment. Before sitting down, sir, I wish to say one word in reference to the treatment. I believe a mustard emetic to be often a very valuable resource; and I think I have had enough of experience to enable me to speak with some confidence on the point. Want of time, however, prevents my giving my reasons for this mode of treatment, which, of course, is not new. In conclusion, I wish to speak of two points bearing on the prognosis. Every one who came in contact with cholera must have met cases where the question of life or death became a very difficult one. They were usually pulseless cases, as far as the wrist was concerned, and they would live in this state for many hours, or even days. In such I observed that, if they were going to die, puerile respiration declared itself, and seemed then to be a sure precursor of death; and, again, I found that one of the sounds of the heart would, under similar circumstances, be lost. Contrary, however, to your observations, sir, on the heart in fever, it was the second sound that was lost, as, indeed, the most plausible explanation of the fact would lead us to expect; for, I believe, both the state of breathing I have spoken of, and the loss of the second sound were directly due to the state of the blood in these patients. It had ceased to circulate, or nearly so; and, as long since shown by Sir D. Corrigan and others, the valvular sound of the organ, that is, the second, must necessarily then be lost."

Dr. Davys said he had come there to hear if there had been any new and efficient method discovered of treating cholera. He had heard a great deal of statistical facts, which he might have obtained from the returns of the Registrar-General, and he had heard some discussion as to whether cholera was contagious or non-contagious, but except what fell from Dr. Moore, he had heard nothing as to the treatment of cholera.

No more dreadful scourge had ever visited this country. In his own district, from the 7th to the 29th September, there had been at least thirty cases. He had seen it attack persons in a good condition of life, and persons in humble circumstances, and if more than ten minutes were allowed him he could prove that cholera was contagious. But what he wanted to know was, whether there was anything new in the treatment of cholera? He himself had tried with cholera patients everything he had heard of, and in no three cases had the same method of treatment succeeded. He had tried castor oil and found it good on some occasions, while it failed on others. The ordinary mustard emetic had succeeded with some and failed with others. He therefore hoped to hear something of importance as regards the successful treatment of the disease, which he regretted to learn was, in the opinion of Dr. Lyons, likely to revisit this country.

Dr. Laing, Staff Surgeon-Major, said he was stationed in Kurrachee, in Scinde, in the month of June, 1848, where all communication was cut off by sea from all parts of the Continent, and little communication by land existed. Cholera came on on the 14th of June, and in the first twenty-four hours 100 men came into hospital. It appeared as if a cloud came across the sun, and at six o'clock that evening the men began to come into hospital, and before seven o'clock there were thirty men lying dead. The disease went on for ten days, and in that time they lost 240 men. He ought to have said that no rain falls in that country; the dew point was very high, there was very little difference in the wet and dry bulb, and there was a constant breeze blowing from sea which kept the air moist. The regiment he belonged to had had a great deal of hard work, and had returned to this place, and were in tents when the epidemic broke out. The other regiments suffered not so much, but they lost a good deal of men also. The men suffered dreadfully, but of the officers in the cantonment only one was attacked, and he recovered. Another officer on the station was attacked and died. The atmosphere was most oppressive. It was a remarkable fact that the brahimine, kites, and crows, which collected about the cantonments to pick up the offal, disappeared altogether, and did not return until all the cases of cholera had ceased. The domestic fowls about the cantonment died, and he was told that the sheep in the neighbourhood suffered severely. The disease left them and went up the River Indus, and gradually appeared to lose itself in the upper country. The dak-runners were stricken down on the road, and found lying there dead. Every mode of treatment was tried. In the first thousand cases of disease there were seventy or seventy-five deaths, and as the disease proceeded towards its termination the mortality diminished. He had since observed the disease in Bengal, and it broke out there under different circumstances. It

appeared about three weeks after the monsoon. The rainfall at the beginning of the monsoon clears the atmosphere, and a fortnight or three weeks after the rain ceases to fall, the air becomes close and oppressive, and it was then they looked out for the appearance of the disease. The moment a case of cholera or diarrhœa appeared, the regiment was moved across the Jumna river, and not a single case of cholera occurred in the six companies, which were thus moved. Diarrhœa, he was perfectly certain, ought to be counted as a concomitant of cholera. He thought every case of diarrhœa, during the prevalence of a cholera epidemic, ought to be regarded as a case of cholera. He thought the principle acted on in removing a regiment from the place in which it was attacked with the disease might be taken advantage of in Dublin. If an outbreak took place at Donnybrook, for instance, if the whole population were moved out of the place, it would save many valuable lives. He approved of the primary treatment of diarrhœa by opium and astringents. When purging came on with suppression of urine and rice-water evacuations, he had found dashing with ice-water to have had more effect than anything he had seen used in the disease.

Dr. Quinlan said he believed that a great many officers who had served in India, and had experience of cholera on an extensive scale, were of opinion that it was not contagious. Now, as there were several army medical officers of Indian experience present, it would be desirable if they would favour the meeting with their views upon that subject.

Dr. Haverty, 52nd Regiment, observed, that from what he had seen of cholera in India, he was strongly impressed with the belief of its non-contagious nature. He had nothing to bring forward in the way of statistics, but he had directed his particular attention to that point, and such was the conclusion at which he arrived. In the treatment of cholera cases he always had the aid of the men of the different companies which were attacked with cholera to wait on the patients, and he could not adduce a single instance of a man having taken cholera who had attended on a cholera patient as a nurse. It had been observed a few minutes ago that the nursing in cholera was different from that in any other disease. The men were constantly and closely employed; they were brought into immediate contact with the patients; and if cholera were contagious, one would suppose these were the very circumstances under which the contagion would spread. Yet, so far as his experience was concerned, the contrary had been the case. He had seen instances of the extremely eccentric way in which cholera travels. On one occasion cholera existed in a place within sixty miles of where his regiment was stationed, and swept the country in the immediate neighbourhood, and carried off a great number of people, yet it did not touch the cantonment in which he was, although there was a high road between the two places, and constant communication kept up. In the next year cholera attacked

the cantonment where he was, and left the city at the distance of sixty miles, and although people were constantly passing from one place to the other, no case of cholera appeared in the latter. Atmospheric influence was much talked off as a means of conveying the cholera in India. In the instance to which he referred the wind was in a direction favourable to the spread of the cholera from place to place, yet the disease passed by some places, and made a jump as it were of sixty miles to another locality. As regarded this cantonment of which he spoke, about ten days after the outbreak took place the troops were moved to a distance of about six miles from their former position, and there also the cantonment was on the high road, about eight miles from a city, where the wretched natives were dying by hundreds, and, it was said, by thousands. The cholera ceased in two or three days after they removed to that locality. Some few cases occurred within twenty-four hours after their removal, but it was probable the men had brought the germs of the disease with them. The disease, however, ceased to spread, and all the time the wind was blowing towards them from the city where the cholera was raging, and there was a constant intercourse kept up with the natives. As regards the treatment of the disease, he was always in the habit of saying that nursing was the only thing for it. He still knew of nothing so effectual as constant attention, the introduction continually and cautiously of nutriment and stimulants, and friction with counter-irritation. It struck him as extraordinary, if the preliminary stage of cholera were ushered in by diarrhea, why there should be strong advocates for the use of purgatives. He should have thought that their great object would have been to check anything in that direction. Their great object was to get hold of cholera in its early stage and put a stop to it, and they were successful in doing this. How purgatives could be advocated, under these circumstances, he was at a loss to understand. Mustard emetics were spoken of as being very useful, but when their object was to check purging and vomiting, he did not see why they should try to induce vomiting by giving a mustard emetic, or any other emetic.

On the motion of Sir Dominic Corrigan, seconded by Dr. Lyons, the debate was adjourned until the following evening.

THIRD NIGHT'S PROCEEDINGS, APRIL 5, 1867.

THE debate was resumed on Friday evening at half-past eight.

THE PRESIDENT OF THE COLLEGE in the Chair.

Sir Dominic Corrigan, having been called on by the President, observed that there was one very gratifying feature in their debates, namely, that they came there to elicit truth, not to support their own opinions, and he was sure there was not a man amongst them who would not sacrifice his opinions if he were convinced that those opinions were wrong. The first

matter he wished to direct their attention to was the map of Ireland which he had placed before them. It represented Ireland, divided by a line from North to South, rather an unusual division. All the towns that were visited by the epidemic of 1848, '49, and '50, were marked black—that is the towns of 2,000 inhabitants and upwards, for they were obliged to put some limit to the returns. All the towns not visited were marked red. A very remarkable circumstance, for which he was not prepared, was that, on the left-hand side of the line—that is, the western side of Ireland—there was scarcely a red dot, while, on the right-hand side, they were in large proportion; and the proportion was this, that in Ulster one-half of the towns escaped, in Leinster one-fourth of the towns escaped, in Munster one-eighth of the towns escaped, and in Connaught not one escaped. He was struck by this remarkable fact, that those portions of Ireland on the right side of the line, where there were manufactures, trade, commerce, industry, roads, and railways, presented a congeries of towns, of which from one-eighth to one-half escaped the ravages of cholera; while, in the West of Ireland, where there were no manufactures, no commerce, few railways, and little intercourse, not a town escaped. This was a remarkable fact, and he alluded to it in reference to a discussion which took place on cholera some time ago, when Professor Haughton stated that he was nearly converted to his (Sir Dominic Corrigan's) view, namely, that contagion was not an all-powerful influence in spreading the disease, were it not that he was convinced that cholera was brought to the West of Ireland by the reapers who caught it in England. He would not dwell further on this point than merely to narrate some facts, which would sufficiently show that these poor men did not, in addition to their other misfortunes, carry cholera on their backs; and having shown that, he thought he would be entitled to claim the gentleman to whom he referred as a supporter of his views. On looking to the report from which that map was taken, he found that the first appearance of cholera in Connaught, in the year 1849, was on the 7th of February, and that visitation extended through the intervening months to September of the following year. The cholera broke out in England in 1848. Now, the Connaught reapers who went to England in 1848, returned to their own country about July or August of the same year. The first outbreak of cholera in Connaught was in February, 1849. Taking those dates into consideration, they should then be forced to the conclusion, if they admitted Professor Haughton's views, that the reapers, having returned to their own homes in August, 1848, contrived to keep cholera as a latent burden until February, 1849. It was utterly impossible to hold that view, and he considered the question of dates to settle the matter—namely, that the Connaught reapers did not carry the disease from England in 1848, inasmuch as it did not break out in Connaught until 1849.

In reference to the influence of contagion, they must take the *pros* and *cons*. He was not an advocate of any extreme doctrine one way or the other in the matter. He would mention some facts which had made an impression on his mind. The police force of Dublin consisted, in round numbers, of 1,000 men. Of these, about 250 reside with their families, and 750 lived in barracks. It was an instructive fact that there were only eight cases of cholera among those thousand men, and of these six occurred in barracks, and two of policemen residing in their own dwellings. Now, of all the men in Ireland who were exposed to cholera, whether from their duties in places where cholera prevailed, or their contact with the sick poor and criminals, there were none more exposed than the police, and yet, out of 1,000 men, there were only six cases of cholera, and four of these occurred in suburban districts. Again, take the workhouses. Dr. Minchin informed him that the North Union Workhouse contained about 2,000 inmates. How many cases of cholera occurred in that workhouse during the late epidemic?—and let it be recollected that the inmates of a workhouse were perpetually changing, and of all places a workhouse was, therefore, peculiarly exposed to the chances of contagion. Only two. He might mention another curious fact. Impure water had been much and often dwelt on as a cause of spreading cholera, and yet here is the description of water used in the North Union Workhouse, in which only two cases of cholera occurred, given in the January number of *The Medical Press* of 1840, by Dr. M'Donnell, Poor Law Commissioner:—"A year and a-half ago I saw the basin emptied for the purpose of cleansing it. It is not possible by description to convey an adequate idea of the abominable compost, from one to two feet deep, that formed the bottom of it. Gay's cloacina might, without regret, have deserted fleet ditch to wallow in its more congenial filth." He (Sir Dominic Corrigan) could fully corroborate that statement. The supply is still from the same source; and he mentioned it to show how cautious they ought to be in taking up water, contagion, or anything else to account for the spread of cholera. The village of Kilcock is full of beggars, and surrounded by bogs. In that village, from 1832 to the present time, a case of cholera has never appeared. If they turned to the clergy, a class much exposed to the influence of cholera, what did they find? Of the Established Church there were in Dublin seventy-six clergymen, and of the clergy of the Roman Catholic Church 137—making, in round numbers, 200. How many of them died of cholera? Not one. Of the medical profession, physicians to workhouses and dispensaries, how many died? Not one. If they turned to Sir Patrick Dun's Hospital they found that not one died. Among the authorities connected with that Hospital there was one who had given himself heart and soul to the work of caring the poor, and had exposed himself without intermission to all the dangers of cholera—Professor Haughton. He did

not die (laughter and applause): not one of the physicians of the Hardwicke Hospital, or of the Mater Misericordiæ Hospital, died; and not one of the Sisters attached to the latter institution, who bent over the dying, and devoted themselves so assiduously to attendance on the sick, caught the disease. Dr. Hayden had adduced two cases as evidence of the paramount influence of contagion. One was that a man said his wife had been in a cholera lodging-house. Now what a cholera lodging-house was he really did not understand; but he would ask his friend to remember that in estimating what was contagious and what was not, if they derived their information from one or two cases only, they might be led astray. He thought if his friend Dr. Hayden would consider the question again, he would, perhaps, not come to such a positive conclusion from two cases. The other case which he adduced was where a man derived his information from a cabman. Admitting the facts to be true, he submitted they were not sufficiently conclusive to found upon them the theory that cholera was eminently contagious. Suppose a man tried to relieve a friend who had got lumbago by rubbing him, and that he got lumbago, it might be said he got it from contagion. He adduced this to show that, in coming to a conclusion as to contagion or not, they could not derive a satisfactory conclusion from one or two cases, but must draw their inference from an immense number of facts. It was the only way in which they could avoid error. If one thousand cases of lumbago occurred from attending lumbago patients, then, indeed, they might say that lumbago was contagious, but they could not come to such a conclusion from one or two cases only. Dr. Hayden had alluded to the Island of Réunion and to Greece; but from his experience he could say, that of all the countries in Europe in which it was impossible to carry out anything, Greece was entitled to the palm, and as for carrying out quarantine in Greece, the thing was utterly impossible. The officials were most corrupt, and he was told at one of the ports that if he paid a drachma to the custom-house officer, he might pass in anything he liked from Beelzebub to Black-death (laughter). In the Cyclades, islands of Greece, there were ports frequented by steamboats from all parts, and there were to be found Copts, Egyptians, Turks, and the nastiest set of human beings he ever saw. It would be perfectly impracticable to carry out quarantine there, and in fact it was not carried out in Greece. The conclusion he would arrive at, was not to take an extreme view of the question. He did not feel himself authorized to say that cholera was, or was not, contagious. He believed almost that any disease might become contagious. What he desired to convey was that contagion in cholera was an element far less powerful than in scarlatina or typhus. If they adopted the other view, and held that contagion was so powerful an element that our hospitals were to be closed against cholera patients, they would do a great deal of harm to mankind, both in its social relations and in its maritime

interests. They should, he thought, look on cholera as a disease in which contagion might become an element, but its contagious nature had never yet been demonstrated. They would commit a great error if they elevated contagion as an influence beyond all others. The practical view he would adduce was this—that when cholera came among us it should be treated as any other evil; that even admitting it was contagious it was less so than scarlatina or typhus. A gentleman, for whose opinion he had a great respect, said he had been disappointed, that he had come there to listen to some improvement in treatment. Now, he looked on the debate, so far as it had gone, as the greatest compliment that could be paid to the Dublin School of Medicine—that it was eclectic; and he thought the great compliment to be paid to it was this, that it had not been lowered as other societies had been, by men coming forward and saying that they had discovered this, that, and the other thing as a cure. There was one argument he had often heard put forward, that cholera must be in the air, or in the water, or in the earth, and if it was not in the air inhaled by our lungs, it must be in the water taken in by our digestive organs. But did we know all the powers in nature? Might there not be some which we did not know and could not understand? It was within his own recollection that there was a time when we only knew with regard to light that it contained the rays revealed by the prism. Now it was known that there were actinic rays, calorific rays, and magnetic rays. A few years ago we knew nothing of ozone, iodine, and bromine. It was better for them therefore to say that as yet they knew not the cause of cholera, than to presume to come forward and say they had arrived at certain knowledge. Let them hope that by observation and reflection, by steadily cultivating those faculties which Providence had given them, they might ultimately arrive at the knowledge of the mysterious powers by which this disease, like other phenomena, spreads itself over the world. (Applause.)

Mr. J. S. Comyn, Assistant-Surgeon Royal Artillery, said—As an Army Medical Officer, and an old pupil of Sir Dominic Corrigan, he would say a few words with respect to his experience of cholera abroad. He was quartered at Malta during the epidemic of 1865, and he had been constantly placed in positions half-way between India, where cholera was endemic, and this country, where it paid periodic visitations. He thought the Military Medical Officers who had spoken of cholera in India had described correctly the state of things there—that the disease struck localities, and that one passing through them was liable to be attacked by it; but in other places he thought that it travelled by human intercourse, and was conveyed by contact. In Malta, in 1865, he had charge of a brigade of Artillery; they were quartered, women and children as well as the men, close to the Lazaretto of Valetta. About the middle of May there was a great alarm of cholera, and towards the end of the

month the Maltese who lived at Alexandria began to pour into Malta. No cordon was established until the 14th of June, and on the 22nd of June Medical Officers were attached to the Lazaretto. They did not know, therefore, the exact commencement of the disease, for it was admitted that it might have been introduced by the choleraic diarrhea, which might have been brought in by those persons. The first case broke out among his own regiment. On the 20th of June, a child was attacked, and died. On the 21st of June he saw another patient. They were taken from a place adjoining the Lazaretto, which had been assigned to the married people, and which was badly drained and unhealthy. The disease occurred in six cases. On the 28th of June, eight days after the outbreak, for there was at first a difference of opinion among the officers whether it was cholera or not, he reported that the battalion should be removed to a long distance. This was not done until the 1st of July, and instead of being removed to a distance they were taken to Valetta, when five were attacked. A woman attending some of the patients was struck down by cholera. A few days after her death her child was sent to Valetta; one of the people who took care of the child died, another was attacked but survived. Another person living within a few yards of them caught the contagion and died. The disease went into the house of an officer, whose wife and maid-servant took the disease, and the latter died; and, although cholera had not broken out last year in Malta, yet in that very house a case of cholera, in all its symptoms similar to the others, except in the immediate danger of death, took place, and was attended by him. With regard to India, Malta, and Dublin, the disease seemed to exist under different conditions. At Malta and other places to which it did not naturally belong, he believed it was carried from one person to another. The case of Sicily afforded a strong proof of this. There was no cholera there in 1865, when vessels coming from other parts were rigorously excluded; but last year the disturbed condition of the island obliged the Italian government to send troops into it, and the introduction of cholera was the result. With regard to the introduction of the disease into Gibraltar he might say a few words:—The 22nd Regiment started from Malta for Gibraltar, on the 6th of July, six days after the cholera had been duly reported by him. Fourteen days after that the first case of cholera occurred in that regiment, and spread from it through the town. Of twenty-six Medical Officers who were present there, many of them men of long Indian experience, he did not believe that one was a non-contagionist. His experience was that men well nourished, young and strong, were not so liable as others to the disease, and might attend the sick with impunity, as did the Medical Officers; but the weak could not do this, and more readily caught the contagion and succumbed to the disease. The families of the married people among the Artillery suffered severely, and the Maltese suffered

much because they were a people living on a low diet. They found that where the air was pure and the apartments large the disease did not stop. In the General Hospital of Valetta only one case arose, although they were constantly introducing the disease. They burnt the bed-clothes, and adopted other measures to stamp it out, and he believed it could be stamped out in these countries, although not in India. The measures which he would venture to suggest ought to be adopted in this or any other country to which the disease was conveyed by ships were, that there should be a port assigned for receiving vessels from all suspected places, and that this port should be under the surveillance of the police, who should be charged with the duty of carrying out the regulations made for the landing of passengers. With regard to the Ionian Islands and Greece, he fully agreed with Sir Dominic Corrigan, that quarantine was not carried out there as it ought to be. But in Malta last year 1866, quarantine had been properly carried out, and not one case found its way into the Island, notwithstanding that it raged all around, and that the embers of cholera remained; for, as he had already stated, in the same house in which an officer's wife had sickened, and her servant had died, a case occurred last year, corresponding in every respect with those cases, except in the immediate danger of death, and some similar cases occurred in Malta in 1866. In India he believed the disease did not require contagion to spread it; here it was different, and we had no excuse for not managing it as the cattle-plague was managed in England, and still more creditably in our own country. (Applause).

Dr. Head wished to bring under the notice of the meeting an instance in which cholera seemed to have been propagated by contagion. On the map before them the town of Portaferry, on the north-east coast of Ireland, was indicated by a black mark; within three miles of that town there was a little village called Cloughey. No case of cholera occurred nearer to that village than Dundalk, except a few cases that occurred in Belfast, and at the time the disease appeared in the village, there was no case at all in Belfast. There was a fishing-boat which belonged to Cloughey, and which had been fishing off the coast of Dublin, near Skerries or Balbriggan. A boy on board, the son of the captain of the fishing-boat, took ill; the father would not put him ashore here, but sailed to Cloughey, where the boy was put ashore and died; the father took cholera and died, and one of the persons into whose house the boy went also took cholera. There were thirteen cases of cholera altogether in that little village, and eight died. A nurse was sent from Belfast to take charge of the patients, and she took cholera. These cases of cholera occurring in that village were distinctly traced to the fishing-boat. It was difficult to explain the outbreak of cholera in that remote and isolated locality, except on the theory of contagion.

Dr. Mapother said he would not have addressed the meeting except

that the explanation of the disease which Pettenköfer had given in 1854, and which had been accepted by the first British and Continental pathologists, was not alluded to by any previous speaker. Personal enquiry in this city, Liverpool, Arklow, and other provincial towns, had convinced him of the truth of this explanation. Three things must concur for the spread of cholera—1st. The importation of the germ. Any one who considered the history of the first Dublin cases, the first Arklow cases (detailed in his “Lectures on public health”), or the statement of the Registrar-General and Dr. Burke, that in nearly every one of the thirty districts attacked, the first cases had been in the persons of individuals coming from places where cholera was present, could scarcely doubt the portability of the disease. The progress of the contagion in the persons of the Dutch emigrants to Liverpool, to the steamship *Helvetia*, in which the disease broke out while off Queenstown, the authorities of which, in a barbarous manner, refused all aid ; its return to Liverpool, and importation to this country with something like retribution, must be convincing. The second item is residence over ill-drained places. While small-pox is due to a pure contagion, and ague to a miasm, cholera requires both agencies for its production. Pettenköfer cites the following instance in proof:—The ship *Carnatic* lay for many days outside Madras, the sailors being frequently in that town. The soldiers whom she was to convey passed directly through the town, and embarked. In four days all the sailors were attacked with cholera, while not one of the soldiers suffered, although they assiduously nursed the patients. To show the connexion between the disease and ill-drained, excrement-soaked places in this city (continued Dr. Mapother), I marked on a large map the houses in which every death by cholera had occurred, and then traced in the streams which, according to Speed’s and Rocque’s maps, were extant in 1610 and 1756, such as the Tongue, the Bradogue, the Hoha, the City ditch, &c. ; and nearly all the cases corresponded to such obstructed and forgotten streams. That third point is, that some persons are more likely than others to catch and die by the disease ; the ill-fed, the drunken, the unwashed, the ill-aired, whose blood is loaded with unhealthy fibrin ; infants in whom that material abounds from the absorption of temporary organs, and the old, whose wasting tissues throw it back upon the blood, suffer most, and most fatally, as there is more pabulum for zymosis. Thus I would explain the cases of the wretched Connaught men and the fortunate policemen, so forcibly contrasted by Sir D. Corrigan. I may announce that Mr. Radcliffe’s experiments for the Privy Council, just completed, prove that rats and mice take the disease if dosed with choleraic fæces, between three and five days after their ejection. As it has been stated that Indian experience is against contagiousness, I beg to refer to Mr. Orton’s work, the fullest and best ever published on the disease, although issued in 1831, and to many of the late reports to the

Epidemiological Society. A few words about treatment: While quinine cures ague (which it probably does by supplying a deficiency of quinoidine, a natural component of ours), the search for an antidote to the cholera poison can never be hopeless, and when malaria, which has felled scores of times as many victims as cholera, has been almost banished from these countries, we must also regard the latter pest as exterminable. I gave Calabar bean to patients in cholera collapse, as it is a direct sedative of the sympathetic system, which, I think, in that pathological state, as well as in the collapse due to a crushed limb, or to fear, is excited. Such is indicated by the dilated pupil and contracted capillaries, which produce the cold surface, the shrivelled fingers, the sunken eyes, and pinched features. Such promising agents as strychnia, warm-water packing, or rolling in cotton-wool, act indirectly as sedatives of the sympathetic. According to the reports, it appears that of eight patients in collapse who took Calabar bean, five recovered, three died—a ratio which acquits my experiment of any homicidal result.

Dr. Cruise said, as the question of contagion or non-contagion in cholera was immediately before the meeting, he thought it only right, in justice to himself and his colleague Dr. Hayden, with whom he had attended a large number of patients at the Mater Misericordiæ Hospital, to mention some facts which led him to the opinion that cholera was contagious and propagable by contact. It was quite true, if they took individual cases, they were liable to the accusation of arguing *a particulari ad universal*; but, he thought, if they examined all the cases carefully, they would find but few in which they might not trace a fair probability of contagion; in other words, he believed that, in many instances, a belief in non-contagion was due to insufficient information. He was called on in the latter part of October to see a clergyman in Clondalkin. He saw him at four o'clock in the afternoon; he was then collapsed in cholera, and died that night. This clergyman had been called upon the previous night to attend a woman in cholera. He remained with her two hours, returned to bed and fell asleep, awoke ailing in the morning, sickened about eight o'clock, and had such marked symptoms that it was necessary to call in Dr. M'Crea of Clondalkin. He pronounced the case to be one of cholera, and prescribed accordingly. The woman's history was as follows:—She had a brother living at Kingstown, who had been seized with cholera and died there. She went to Kingstown to attend the wake, remained there three days, returned to Clondalkin, took cholera on that day, and died on the day following. It might be chance that caused this woman to take cholera, and chance that caused the clergyman who attended her to take cholera also, but the coincidence was, at least, very remarkable. A young woman was admitted to the Mater Misericordiæ Hospital with her child labouring under cholera. The woman recovered, the child died. What was the history of this case? The young woman

lived in the county of Kildare. She had a single child, which she placed at nurse in Cork-street. She heard that the nurse with whom she had placed the child was ill, and came up to town to see after the baby. She found the woman ill of cholera. She removed the child to a street off Marlborough-street, where they both took cholera, and were sent a few days after to the Mater Misericordiæ Hospital. He admitted that this might be all chance; but it was possible to entertain an opposite opinion. Several gentlemen who had had large experience in India said that cholera was not contagious. To their opinion the utmost respect was due, because their opportunities of observing cholera were much larger than we possessed in this country. Nevertheless it was right to state that opinions differed with regard to cholera in India. When attending cholera cases last year in the Mater Misericordiæ Hospital he met a fellow student of his own, now a distinguished surgeon in the Indian army. He asked him what was his experience of the disease in India, and he replied that it was looked on as decidedly contagious; that there was the utmost reluctance on the part of the men to attend on the cholera patients, and that there was almost a mutiny in his regiment from the enforced attendance on the sick. He said also that a large proportion of men who discharged this duty took cholera, but not one of the officers was affected. A large number of medical students, who displayed so much earnestness and zeal during the epidemic in France, were seized with cholera, and died of it. Referring to the registry of the cases treated in the Mater Misericordiæ Hospital, it would be found that a large proportion of the cases came from houses in which cholera was raging. For instance, a case would come in from Greek-street, and it would be followed within two, three, or four days by others coming from the same house. This might be only chance, but it was only fair to admit that it was not altogether unreasonable to entertain an opposite view. For his part he quite agreed with Sir Dominic Corrigan, that the degree of contagion in cholera was not comparable to that of typhus and scarlatina. But the question of degree was not in point as regarded the question of contagion itself. The fact that cholera had arisen where there was no way of accounting for it by contact, was no proof of its non-contagious nature, for he had seen cases of typhus and scarlatina arise under similar circumstances. Neither would he admit that the non-spreading of the disease was a proof of the non-contagion theory. In the Mater Misericordiæ Hospital not a single case arose from spreading within the walls of the institution; but it was right to state that the hygienic measures adopted there were extreme. He might quote the statement of Dr. Stokes in reference to typhus, that there had not been one case of the spreading of that disease from the fever wards of the Meath Hospital to the cholera wards. An instance occurred under his own observation, where a child was sucking when the nurse was labouring under malignant

typhus, yet the child never showed a symptom of the disease. No one, for this reason, would venture to say that typhus was not highly contagious. In his opinion, if they carefully investigated all the cases of cholera, they would find sufficient reason to believe that it was propagable by contagion, although not nearly so virulent as typhus, small-pox, or scarlatina.

Dr. Murrogh, H.M. Madras Army, said that he had served twenty-two years in India, and had had much experience of cholera, and that he never saw a European or a native soldier hesitate one instant to attend on his comrade who was stricken down with the disease. He made it a rule to ascertain whether the soldiers called on to discharge that duty had any fear or timidity with regard to the disease, and he had never met with an instance of the kind. His experience of twenty-two years in India had taught him that cholera was not in any way propagated by contagion. He had seen thousands of cases of cholera; he had attended it in the camp and in the field, and he had the disease very severely himself, but he did not get it from communication with the sick. He got it at a time when there was not a single case of cholera within a hundred miles of where he was stationed, and he attributed it to having drank three or four glasses of sour claret (laughter). He had been exposed to contagion as much as any man could have been, but he did not take the disease in that way. He remembered two of his apothecaries being struck down. One of them was a very timid lad, very nervous and apprehensive of the disease; he was very zealous, exerted himself too much, and became greatly debilitated, and sunk under the attack. The other recovered. He thought all the medical men of experience in India would coincide with him that cholera was not contagious. Previous to his going to India he had experience in cholera. In 1832, when the epidemic was in Edinburgh, he was a volunteer in the hospitals there. After taking his degree he was employed under the Cholera Board in this country, and he attended cholera in the counties of Waterford and Cork. He went to India a confirmed contagionist, if ever there was one, but in that country he saw no preparations for a contagious disease. Every man who was attacked was at once sent into hospital, just as if he had a broken leg, and the disease was never communicated from bed to bed. It took him some four or five years before he got rid of the idea that cholera was contagious. As to the young gentleman from whom Dr. Cruise derived his information, he was probably ignorant of the Indian language, and did not know what the natives said to him. The native soldiers were most affectionate to their comrades. He never saw a native soldier refuse to attend his fellow-soldier; in fact, there was a religious feeling among them on the subject that would render the thing impossible.

Rev. Professor Haughton said his friend Sir Dominic Corrigan had

done him the justice to say that he was willing to die in the cause of cholera, but he seemed rather to complain that he did not die (laughter). Now, whatever little service he might have rendered in the cholera epidemic, he did with the full resolution under no circumstances to die (laughter). But, at the same time, he was willing to confess that if he had ten lives or twenty lives he would gladly lay them down to help the poor. He would say in the words, not of a christian, but of a pagan — *Homo sum, humani nihil a me alienum puto* (applause). He should be sorry to deprive the friends and relations of the good priest described by Dr. Cruise of the mournful consolation that he died as a good clergyman should, with his eyes open to the danger he incurred, and in the brave discharge of his duty. He was free to confess that the production of the map now before them was due to the suggestion of his friend Sir D. Corrigan. On the former occasion, to which allusion had been made, he was greatly struck with Sir Dominic's cholera map; it seemed to him a most valuable contribution to the cholera epidemic in 1849; it contained a valuable record of the towns that were attacked by cholera and that escaped it, but it was not accompanied with any explanation as to how a certain set of towns acquired the cholera, and how another set of towns was exempted from it. In the pamphlet which accompanied the map Sir Dominic Corrigan threw out a suggestion as to the reason why the eastern towns were exempted from the disease, while the western towns were subject to it. This was a mere guess, and as he (Professor Haughton) was equally entitled to make a guess, he ventured upon one, and the unfortunate reapers came into his head. He wanted to supply, if possible, a clue to Sir Dominic Corrigan's map. He presumed now, from what they had heard that evening, that the poor reapers were blamed unjustly, and that they did not carry the cholera from England to Connaught. But he thought Sir Dominic Corrigan's map was no longer a puzzle. He ventured to say that the map he had constructed of the cholera epidemic of 1866 gave the key to the older map of 1849, which would prove of the greatest possible value to medical science. He started with a general feeling in favour of the contact theory, but with a determination not to allow himself to be influenced by that view in opposition to facts. The result of his inquiries had been the map before them, and he had evidence to show that nearly every town which was marked in black as having been visited with cholera, had derived it either directly or indirectly from the town of Liverpool, and there were only a few towns on the map—Parsonstown for example, which derived it from Sheffield, and Westport, to which the contagion was carried by sea, from South Wales—which were not indebted to Liverpool for the disease. Cholera entered Ireland at four points by sea: Belfast, Dundalk, Drogheda, and Dublin. Dr. Head had stated the remarkable circumstances connected with the outbreak of the disease in the little village of

Killoughter in the North. Other towns derived the cholera from Dublin, which was a secondary or indirect importation from Liverpool. He had marked the lines of railway along which the epidemic travelled, and had divided the towns into groups according to the time at which they were attacked. Thus, Dublin was No. 1, Belfast 2, and so on. The disease did not travel in a direct line, as it would if it were conveyed by the atmosphere, but jumped from place to place as it would if conveyed by personal influence. The reason why Mallow suffered before Newbridge was that the cholera patient who brought the disease to Mallow took a ticket for Mallow, and not for Newbridge. If he stopped at Mountmellick he would have brought the disease there, or if he went to Kilcock he might have introduced it into that dirty village, and killed the Kilcockians (laughter). The comparative exemption of Ulster, and the apparently sporadic spread of the disease into the west of Ireland, were apparent on his map as well as in the map of 1849; the resemblance between the two maps was great, and the same facts were disclosed by both. He gave his friend Sir Dominic Corrigan credit for more than his usual skill in finding an explanation for the facts. The reason why Sir Dominic thought Ulster was exempted from the disease was, because the people of Ulster are more prosperous, more active in their commercial enterprise, and therefore must be supposed to have more intercourse with each other than the people of other parts of Ireland. Every one who knew intimately the self-reliant people of Ulster knew that the contrary was the fact. Ulster consisted of a series of isolated centres of enterprise. Each man in that centre considered himself superior to every one in any other part of the earth; he held little intercourse with others, and as to the *Times* he did not believe in it, and it was to be wished that other people in Ireland would follow his example in this respect (laughter). Places like Enniskillen, Strabane, Dungannon, and Omagh were, as he had said, isolated centres of industry; they had little or no intercourse with Liverpool, they did not go there, they did not care about it, and therefore the same broad fact appeared on his map which was exhibited by the map of Sir Dominic Corrigan—the exemption of these local centres of industry in the North from the disease. As to the spread of the disease into the West, he had got information with respect to its importation into Westport, Ballinasloe, and Kilrush. Dr. Croker King gave him the names of the persons who brought it to those places. In fact, all those cases which would otherwise be regarded as due to sporadic or epidemic influence were explained the moment they obtained the history of the individual cases. He thought this discussion, which had the result of showing that there was less difference of opinion between them than when they commenced, could lead to no more interesting or important result than a demand upon the poor-law authorities to inform them in detail of the opinion of the medical officers employed under them in each

town and district, as to how and when the cholera was introduced into their respective districts. Cholera, and the introduction of cholera, like every other matter of science, must be subject to the rules of severe logic, and as several of the observations made that evening exhibited very lax views on this important subject, perhaps they would allow him to state what he believed to be the correct view of the contact theory of cholera. The contact theory of cholera was based on two hypotheses. The first was one they were all familiar with; there must be, *ab extra*, a materies morbi. For the second term he would propose a new form of expression. Receptivity was bog latin, but he had found an expression in the works of the elder Pliny, who lost his life, in the pursuit of science, at the destruction of Herculaneum, which, he thought, would be appropriate. Pliny, speaking of a friend, described him as *capax secreti*—one who could hold a secret if you put it into him, and he carefully excluded his wife from that category (laughter). Now he would propose the term *capax morbi*, which means the capacity of receiving the disease, and the capability of holding it when you got it, as the second hypothesis on which the contact theory depended. If they accepted these two hypotheses, they easily disposed of two classes of fallacies—fallacies of which he believed he had heard a great deal that night. First, the occurrence of cases in which persons were in contact with cholera who did not take the disease. He envied them their luck. They must be very tough, and have magnificent constitutions; and their friend, the army surgeon, who had described his views on the subject so clearly, might be perfectly certain that he was not capable of taking the disease, while more delicate persons were. The secretions of the skin in tropical climates might also have some influence in preventing contact being so dangerous in India as it would be in a colder climate. The second class of cases were those in which genuine cholera occurred in persons who were not in contact with the disease. This was illustrated by the outbreak in Mountjoy Prison; but he was sure his friend Dr. M'Donnell would not press that beyond its legitimate consequence, which was to show how difficult it was to ascertain exactly the origin of the disease in every case. Here they must confess their ignorance, but he would not confess ignorance in general. The contact theory, he submitted, was much more probable than any other that had been advanced. But on two points they were ignorant—they were ignorant of the precise nature of the materies morbi, and of the precise quality of body that constituted the *capacitas morbi* in the subject. He trusted one important result of their debate would be, that in future they would direct their attention in a more precise manner to trace the particular channel by which the disease entered the body, and the particular condition of malaise or ill health which rendered an individual susceptible of it (applause).

Dr. White said, as one of the medical officers practising in a district

in which a great deal of cholera appeared last Autumn, he wished to say a few words on the subject. The first case of cholera which occurred at that side of the county of Dublin came under his notice. It was that of a lady whom he attended in her confinement, and he could not say, from what he had heard that evening, but that he had himself been the means of communicating the disease. He was attending at the Meath Hospital, watching the progress of cholera, the very day on the night of which he was called on to attend this lady. On the fifth day after her confinement she was attacked with cholera, passed through the disease, and recovered; on the sixth day of her illness the nurse-tender was attacked at half-past two in the morning, having gone to bed well on the previous night. This woman died. The other attendants in the house were very careful as to cleanliness. As to the nurse there was probably the *capacity* in her system, for the woman was a drunkard, and had been indulging largely in spirits when in attendance on the lady. The next case which came under his observation was that of a gentleman who lived in a large, well-situated country house; he had been in Dublin during the day. He was attacked with cholera at night, passed through the disease well, and immediately on his convalescence his wife, who had been in close attendance on him, was also attacked with cholera. On the third occasion he was called in to see a servant in one of the best houses in Rathgar. There was nothing to account for her illness that he could find out, except the one fact, that she had been at a party at Donnybrook, where cholera was prevalent, and the night following she was in cholera. An infant was in bed with her when the first indications of disease appeared. A few hours after being removed the infant presented all the symptoms of Asiatic cholera, passed through it, and recovered. The woman died. With respect to the immunity of the police from the disease, he should say that, in his district, the police did not come into contact with the cholera patients, for they performed no sanitary duties. Two policemen in Crumlin were attacked, and attended by Dr. Davy. The first man recovered; the second, who slept in the same barrack-room, and was in attendance on his comrade, received the disease, and, he regretted to say, succumbed. There was another man who acted as nurse-tender; he never showed the least sign of illness.

Dr. Charles F. Moore said—As no other city district medical officer had addressed the society, he was desirous of mentioning the course cholera appeared to take in No. 3 dispensary district. 190 cases of cholera, and considerably more than 1,000 of diarrhea, came under the notice of the medical staff of that district. The first case of cholera was that of a labourer, who worked near the quays, where the cholera first appeared in this epidemic, but who resided in Bride-street: subsequent cases occurred in over-crowded and otherwise unwholesome cellars and other tenements. One of the worst outbreaks took place in a house

inhabited by the lowest class of prostitutes, and spread thence to the adjoining houses, which, after much trouble, the medical officers succeeded in getting closed. From three or four centres the epidemic radiated to the other parts of the district. In 1854 he was one of the physicians of the Finglas Cholera Hospital; the epidemic on that occasion commenced in a man just arrived from Belfast, who, after eating to excess and drinking much porter, was seized with the disease; he recovered; but a girl, living in the same very unwholesome house as this man, took the disease, and died of it, and at her wake several persons sickened, and thus the disease rapidly spread through the village, and many persons fleeing thence carried cholera to Kill of the Grange, the North Dublin Union Workhouse, and in other directions. His (Dr. Moore's) previous experience in Southampton, Egypt, the Mediterranean, &c., also had led him to consider that the disease spreads from person to person. The last Army Medical Report, that published in 1866, contained much evidence to show that the disease was communicated from those already sick, or in contact with the sick, to the healthy; the very striking instance of the last epidemic in Gozo afforded evidence on this point. That island was remarkably secluded. The disease spread from a sailor who returned to his native island from Malta with the cholera upon him—first, to his own family and friends who had nursed him in the disease, and by these persons the illness was carried to the hospital in Rabbaro, the chief town of the island, whence it spread to the general population. Dr. Gordon's work on *Hygiene*, published in Calcutta in 1866, recognized the spreading of cholera by contagion in numerous instances where pilgrims passed near bodies of troops, &c. He would only add, in conclusion, that the experience of the past, as well as of previous epidemics in Malta, and what he himself had observed at home and abroad, led him to believe that human intercourse was the chief element in the spread of the disease.

Dr. Laing, Staff Surgeon-Major, said—A gentleman remarked on the previous night that he never heard of the epidemic influence of cholera travelling faster than man could do, but he (Dr. Laing) did not think it could travel nearly as fast. Any one who ever observed in the country the smoke from a fire, must have seen how every little inequality, every bush and tree stopped it, and prevented it from travelling quickly; and he was of opinion that rivers were quick channels for the conveyance of epidemic influences—not from their having “traffic” on them, and being, therefore, a means of human progress—but because the smooth surface of the river offered less impediment to the travelling of the epidemic influence along it. He was frequently in the swamps of America, and observed that the people who lived on hard ground in the middle of these swamps were perfectly free from attacks of intermittent fever, whereas those on the border portions of the clearing, where the original forests remained, were subject to severe and prolonged attacks of intermittent fever,

showing the appearance of it in their countenance, and an enlargement of the spleen. He was in Prescott, on the banks of the St. Lawrence, when cholera came to Quebec—how or when he could not say. It came, he believed, when the emigrants landed at Quebec, and they heard of it appearing at various towns on the St. Lawrence. Every morning he went down to the wharf where the steamers touched, to hear anything about it that was to be learned. A poor German emigrant woman, who had the disease, was landed at the wharf. She was put into a shed, and the most effectual quarantine surrounded her, for no one went near her but her husband and himself (Dr. Laing), and he fed her and brought her the food with his own hands. The disease broke out in Prescott, and spread round the town. In one place there was a small two-storied house of wood. It was surrounded by poplar trees, standing so closely and thickly together that they prevented the light getting into the windows. The house was exposed to a breeze coming across part of a river which had been embanked for the purposes of the railway. The breeze blew directly on the house, and in that house he attended eight cases of cholera, all of which died. He attributed this to the cholera malaria coming up and across the river, and being collected and kept round the house by the trees. He thought this showed that in most cases sanitary reform was the great thing to be attended to. He might observe, in reference to a statement which had been made by one of the speakers that evening, that he had lived a good deal of his life in India, and had been attached to English and Irish regiments, and he never yet saw a British soldier refuse to attend his comrade in sickness. If he held up his hand he would have a hundred volunteers for the duty. If the medical officer, who said he found reluctance on the part of the soldiers to attend their comrades, belonged to the regiment, he and other officers must have shown a bad example. It was the officers who were really answerable for the conduct of the men.

The President said it now became his duty, as their chairman, to make a short summary of the proceedings of the last three nights. In the first instance, they had reports from the various Dublin Hospitals that had opened their doors to receive cholera patients—the Meath, Hardwicke, Sir Patrick Dun's, and the Mater Misericordiæ Hospitals, and also one from the Mountjoy Prison. In addition to these they had a most valuable abstract of a report of a recent epidemic at Utrecht, which they owed to the kindness of Dr. William Daniel Moore, and they had a report from the Bray Hospital by Dr. Darby. Now the debate of the two last nights could hardly be considered to have been on those reports. It took a wider range, and he thought none of them could regret it, inasmuch as it had brought out a great store of interesting information from the army medical officers, for which they all felt deeply indebted. The results of the reports might be considered in a three-fold point of

view. First, as to what additions the experience of the late epidemic had made with reference to the pathology of the disease. Next, as to its treatment; and third, the question of its communicability or its mode of outbreak. Several dissections of cholera patients were recorded. Dissections had been made at the Meath, Hardwicke, Mater Misericordiæ, and Sir Patrick Dun's Hospitals. Nothing of importance had been realized, and this was what they should expect; for cholera, which, as they would all admit, was in the category of essential diseases, was not an affection that would show appreciable anatomical changes. Anatomy told them what it was not, not what it was; its information was negative, and there was one reason for this besides others—namely, the short course which the disease runs, so that there is not even time for the formation of those secondary organic affections which so commonly arise in essential diseases. Certain changes had been found, but they were quite incompetent to explain the nature of the disease; they were inconstant and unnecessary. The blood had been found thick and tarry, and the rigor mortis well marked. The rise of the temperature after death was a very curious circumstance that had been recorded in the Hardwicke and in the Mater Misericordiæ Hospitals. In this respect there was a curious analogy between cholera and sunstroke; the rise of temperature in the latter had been recorded by many military officers; it might rise three degrees beyond what it was at the time of death. He might be excused for alluding to another analogy, which would go for as much as it was worth. Last year, in the *Dublin Quarterly Journal*, there was a paper on sunstroke by a pupil of his own, Dr. Baxter, and he held that there was a very great analogy indeed between many of the phenomena of sunstroke and the phenomena of malignant or spasmodic cholera. Another remarkable fact had been observed—viz., that the extreme lividity of the body before death disappeared very much after death. Something very similar had been observed in cases of the disease called by some, "Purpura Maligna," and the "Black Death," where the large petechial or ecchymosed spots, almost black at the time of death, became red on exposure to the air. The right chamber of the heart was found full of blood, and a coagulum was formed in the pulmonary artery. Dr. Kennedy had alluded to puerile respiration arising from weakness of the heart as a symptom threatening death. This was very important; it showed a great analogy to other cases of weakness of the heart, for one of the most remarkable signs of fatty degeneration of the right side of the heart was the existence of loud puerile respiration, either constant or occurring in fits. The brain had been found generally healthy, and the spinal-marrow also. There was nothing else remarkable but a washed appearance of the intestines, and, in some instances, the bursting of Peyer's and Brunner's glands. The next thing to be observed was cadaveric twitchings. This was an extraordinary phenomenon. He was

acquainted some years ago with Staff-Surgeon Marshall, an old Indian officer, who stated that in the early outbreak of cholera they were all anxious to determine the nature of the disease by post mortem examinations; but he found it difficult to go on with the dissection, for the moment the incision was made in the sternum, the body would spring up with frightful gestures, as if galvanized, and it was very hard, he said, "to make the young hands go on." As to treatment, no cure had been discovered for cholera, and no cure, no specific was sought for. In this respect cholera was not peculiar. There was no cure for any essential disease. No man could venture to say that this or that treatment will cure an essential fever. The physician guides it to recovery. He knows the system is exposed to two dangers—debility and secondary disease—and steering between these two rocks, he guides it until the time when the clock strikes and the disease ends of itself, either in death or recovery. So it is with cholera. In the reports from some of the hospitals, there were columns apparently recording the results of special treatment, and this was objectionable, for it led to misconception as to the practice of the hospital. They read of so many cases treated by calomel, so many by white of eggs, so many by stimulants, and so forth. The objection to such a column as this was, that it might lead the public or medical men at a distance to the erroneous impression that in the Dublin Hospitals there had been any cases treated by this thing or that thing alone. The great characteristic of Irish medicine, as Sir Dominic Corrigan had said, was its eclectism; and when they inquired into the treatment of cholera patients, they found that it had been decidedly eclectic, and no one mode of treatment had been adopted in any number of cases. But with respect to palliative treatment something might be said. It had been found in some of our hospitals that an admirable method of relieving painful spasms was by the inhalation of chloroform. This might be done with perfect safety, and repeated again and again—not to such a degree as to produce insensibility, but to act as an anesthetic, and procure the patient relief. So also they found in the Meath Hospital great value, in the collapse, from Sir D. Corrigan's button cauterization along the spine. In cases of suppression of urine, even when uremic symptoms had appeared with complete suppression for forty-eight hours, cupping repeated again and again, drawing a few ounces of blood, had restored the secretion of urine, and been attended with success. The treatment by saline injections had been tried by him, and with the usual result of apparent and almost instantaneous relief; but in the course of a few hours purging came on again, and the case was as bad as ever. In the Mater Misericordiæ and the Meath Hospitals the treatment by calomel was tried, and with some fortunate results. It was found that when bilious stools were produced, the patient's chances of recovery were greatly increased. Now, as regards the question of contagion, Dr. Kennedy spoke of negative evidence, by

which he meant the general opinion among gentlemen who practised in India, against the doctrine of contagion. It would be quite wrong to shut their ears to the evidence of these gentlemen. It was extremely important, however, on the other hand, that they should remember they were not to infer the phenomena of disease in one part of the world from those in another. The question of contagion in the North—in European countries—had some elements of difference from the question of contagion in tropical climates. The principal mortality in India occurred among the natives; and here we got another element—the comparative mortality of the disease in coloured men and in white men. It might be that the natives of the tropical climates, and the coloured races generally, were more liable to the exciting causes of cholera than the whites. He thought that extremely probable, and it also might be that contagion was apt to be more rife in the colder than in the warmer climates. It might be said, also, that the European constitution was less liable to contagion in India than in a more northern climate. So far as he could collect from Dr. Mackesy, who had had great experience, that was his opinion. Dr. Lyons, who advocated the non-contagion theory, had dwelt on the fact of the immunity of a large proportion of the staff of the Hardwicke Hospital. A similar circumstance was observed in the Mater Misericordiæ Hospital, where there was a large staff of physicians, and of Sisters of Mercy and hospital nurses, in constant attendance on patients, and yet there was not a single case of contagion. This showed, in a striking manner, that the disease, during the late epidemic, was not eminently contagious. But when they recollected the epidemic of 1849, and recalled to mind the terrible mortality among medical officers who were sent down to the country—five medical men, for instance, having been struck down in Sligo—they had a set-off against the immunity of Dublin during the late epidemic. The outbreak in Mountjoy Prison might be set against the contagion theory, and seemed to point to the spontaneous origin of cholera. But it was to be remembered that at the time of this outbreak there was a general epidemic prevalent, and they had to balance the chances of some communication from without, with those of the spontaneous generation of the disease within. It was remarkable that, coincident with the outbreak of malignant cholera in the prison, there was a great number of cases of choleraic diarrhea, and this furnished them with arguments for the philosophic view put forward by Dr. Darby—that when there was an epidemic of cholera, all those cases of diarrhea which were apt to run into cholera must be considered a species of cholera of a mild form. If this be so, and he had no doubt of it, it would greatly diminish the percentage of mortality, which, in place of being 50, would be only 20 or 30 per cent. The proofs of contagion in any epidemic mainly depend on a balance of probabilities, and the application of the doctrine of chances might be well made to clear up the

matter. This was done in reference to fever by the late Dr. Whitley Stokes, who proposed certain problems to the Bishop of Cloyne, who was well skilled in the calculation of chances, as to the probabilities for and against the occurrence of ascertained events, assuming that the illness of one person did not promote that of another. The society will find the results in Dr. Stokes' observations on contagion. This mode of proceeding was eminently deserving of the attention of the society. Dr. Stokes concluded by congratulating the society on the three meetings, and thought that great good would come of the discussion which had taken place.

On the motion of Sir D. Corrigan, seconded by Rev. Professor Haughton, a vote of thanks was passed to the military medical officers for the information which they had given to the meeting.

The meeting then separated.

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3. Hysteria, remote causes of disease in general, treatment of disease by tonic agency, local and surgical forms of hysteria, &c. Six lectures delivered to the students of St. Bartholomew's Hospital, 1866. By F. S. Key, F.R.S., &c. London: Longmans, 1867. Post 8vo, pp. 107.
4. On ovariectomy (clinical surgery, part vii.) By Thomas Bryant, F.R.C.S., assistant-surgeon to Guy's Hospital. London: Churchill, 1867. 8vo, pp. 151.
5. On joint diseases; their pathology, diagnosis, and treatment, including the nature and treatment of deformities and curvatures of the spine. By Holmes Coote, F.R.C.S., surgeon to St. Bartholomew's Hospital, &c. London: Hardwicke, 1867. 8vo, pp.
6. Fourteenth report of the executive committee of the United Kingdom alliance, to procure the total and immediate legislative suppression of the traffic in intoxicating liquors as beverages, 1865-6. Manchester. 8vo, pp. 63.
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8. Transactions of the obstetrical society of London. Vol. VII., for the year 1866. London: Longmans, 1867. 8vo, pp. 404.
9. Catalogue and report of obstetrical and other instruments exhibited at the conversazione of the obstetrical society of London, held by permission of the royal college of physicians, March 28th, 1866, with numerous illustrations. London: Longman, 1867. 8vo, pp. 229.
10. Lectures on public health, delivered at the royal college of surgeons. By E. D. Mapother, M.D., &c. Second edition, with numerous illustrations. Dublin: Fannin and Co., 1867. F.cap. 8vo, pp. 664.
11. Change of air considered with regard to atmospheric pressure and its electric and magnetic concomitants in the treatment of consumption and chronic disease, with a general commentary on the most eligible localities for invalids. By J. C. Atkinson, M.D. London: Trübner, 1867. Post 8vo, pp. 142.
12. Lectures on some of the applications of chemistry and mechanics to pathology and therapeutics. By H. Bence Jones, M.D. London: Churchill, 1867. 8vo, pp. 314.
13. Acupressure, an excellent method of arresting surgical hemorrhage and of accelerating the healing of wounds. By W. C. Pirrie, C.M., M.D., &c., and Wm. Keith, M.R.C.S.E., M.D., &c. Illustrated by engravings on wood by Bagg. London: Churchill, 1867. Royal 8vo, pp. 190.
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35. Some account of the pavillion hospital, recently erected at the Chorlton union workhouse, Withington, near Manchester. By Thomas Worthington.

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